NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date:

Region: Fayetteville Regional Office
County: Cumberland
NC Facility ID: 2600009
Inspector's Name: Gregory Reeves
Date of Last Inspection: 01/07/2016
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Hexion Inc. - Fayetteville Facility

Facility Address:
Hexion Inc. - Fayetteville Facility
1411 Industrial Drive
Fayetteville, NC 28301

SIC: 2869 / Industrial Organic Chemicals,nec
NAICS: 325199 / All Other Basic Organic Chemical Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: N/A
NSPS: N/A
NESHAP: MACT Subpart DDDDD, MACT Subpart FFFF, MACT Subpart EEEE
PSD: N/A
PSD Avoidance: N/A
NC Toxics: 02Q .0711
112(r): N/A
Other: TV Permit Renewal

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Kevin Morris Site Leader (910) 485-9225 1411 Industrial Drive Fayetteville, NC 28301	Kevin Morris Site Leader (910) 485-9225 1411 Industrial Drive Fayetteville, NC 28301	Michelle West Environmental Leader (910) 485-9221 1411 Industrial Drive Fayetteville, NC 28301

Application Data

Application Number: 2600009.14A / 260009.14B. 260009.15B/260009.15C
Date Received: 04/25/2014; 10/07/2014; 02/19/2015, 04/10/2015
Application Type: Renewal / Modification
Application Schedule: TV-Renewal / TV-Minor/ TV-Minor, 502(b)(10)

Existing Permit Data

Existing Permit Number: 03387/T43
Existing Permit Issue Date: 02/06/2015
Existing Permit Expiration Date: 01/31/2020

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2014	1.33	16.24	16.36	40.18	2.75	9.65	6.79 [Methanol (methyl alcohol)]
2013	0.1200	12.21	16.82	38.40	2.30	10.18	6.75 [Methanol (methyl alcohol)]
2012	0.0600	11.61	17.64	38.97	2.30	10.68	7.13 [Methanol (methyl alcohol)]
2011	0.0700	12.11	20.01	39.08	2.30	13.07	7.26 [Methanol (methyl alcohol)]
2010	2.47	10.03	19.89	38.69	1.95	12.65	6.98 [Methanol (methyl alcohol)]

Review Engineer: Betty Gatano

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 03387/T44
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Application

Momentive Specialty Chemicals, Inc. – Fayetteville Facility (Momentive) previously held Title V Permit No. 03387T42 with an expiration date of January 31, 2015 for a chemical manufacturing facility located in Fayetteville, Cumberland County, North Carolina. The permit application for a permit renewal without modification was received on April 25, 2014, or at least nine months prior to the expiration date. Therefore, Air Permit No. 03387T42 shall not expire until the renewal permit has been issued or denied, per the application shield in General Condition 3.K. All terms and conditions of the existing permit shall remain in effect until the renewal permit has been issued or denied.

Permit Application No. 260009.14B, received on October 7, 2014 and amended on April 7, 2015, and Permit Application No. 2600009.15B, received February 19, 2015, were consolidated with the Renewal Application No. 2600009.14A. The following actions are to be made under the consolidated applications for permit renewal and modification:

- Replace the current catalytic oxidizer (ID No. CD17) used to control emissions from the mixed oxide catalyst formaldehyde plant (ID No. ES16).
- Permit the storage of 50% formaldehyde in the current urea formaldehyde concentrate (UFC) storage tanks (ID Nos. MOSTORE1A, MOSTORE1B, and MOSTORE1C).
- Permit the storage of UFC and hydrolyzed re-work resin in two 50 %wt formaldehyde storage tanks (ID Nos. MOSTORE1D and IE) and the 50 %wt formaldehyde or water/wastewater storage tank (ID No. MOSTORE2).
- Permit unloading and storage of sodium lignosulfonate and glycerin solution in the temulose/ beet molasses work tank (ID No. ITBT).
- Increase the rate at which urea is transferred through the urea weighing and conveying operations (ID Nos. UWC1, UWC2, ES24, and ES26).
- Add heat exchanger (ID No. HX12).
- Permit the existing boilers (ID Nos. ES-3 and ES-4) to allow for firing of No. 2 fuel oil.

In addition, on April 10, 2015, the facility submitted notice of a 502(b)(10) change. The change involves emptying a liquid hexamine storage tank (ID No. ESLH2) and relocating it to the wax production process area. The tank will be renamed Tank 4201 and will store triglyceride/oils of mixed fatty acids, slack wax or emulsified wax. This change will be incorporated into this permit renewal/modification.

On January 21, 2015, the facility submitted a permit application for a name change. Air Permit No. 03387T43 was issued on February 6, 2105 to Hexion, Inc. – Fayetteville Facility (Hexion). Air Permit No. 03387T43 will expire on the earlier of January 31, 2020 or the date the renewal of permit 03387T42 has been issued or denied. The facility will be referred to as Hexion for the remainder of this permit review.

2. Facility Description

As described in the most recent compliance inspection report,[1] Hexion is a chemical manufacturing facility that produces formaldehyde, urea-formaldehyde resins, phenol-formaldehyde resins, hexamethylenetetramine (Hexamine), and emulsified wax.

[1] Greg Reeves (February 19, 2014).

The facility has four plants that manufacture formaldehyde using a continuous process by reacting air and methanol over a catalyst bed. Three of the four plants (ID Nos. FORM12 and FORM3) use a silver catalyst in the reaction process and are often referred to as the silver plants. The silver plants also produce methaform, which is a formaldehyde/ methanol blend. Air emissions for the silver plants are controlled by tail gas-fired boilers, which are fueled primarily by hydrogen gas emitted from the conversion of methanol to formaldehyde. The fourth formaldehyde plant (ID No. ES16) uses a mixture of molybdenum oxide and other metal oxides compounds as the reaction catalyst. This process is referred to as the mixed oxide or MO plant. Urea-formaldehyde concentrate is also produced in the MO plant. A catalytic oxidizer is used to control the emissions from the MO plant.

Most of the formaldehyde produced at Hexion is used in the resin production process at the facility. Hexion has two batch reactors (ID Nos. BR2 and BR3) that are used to produce urea-formaldehyde resins. A third batch reactor (ID No. BR4), called the swing reactor, can manufacture either urea-formaldehyde or phenol formaldehyde resins. A dual scrubber system consisting of a first stage of once through city water and a second stage of re-circulated sulfuric acid solution controls emissions from the resin reactors, receiving tanks, and weigh tanks. Non-reactor batch plant vent gases are controlled by a cartridge type fabric filter in series with a once through city water scrubber. Most of the resin produced at the facility is raw resin, which is blended with various additives off-site by customers before final use. Hexion also pre-blends some of its resins with these additives to produce "Ready to use" (RTU) product, which is ready for use when it is received by the customer.

The majority of resins produced at Hexion are used in the wood products, plywood, and particle board industries. Some are used as coatings on circuit boards, for air filters and in the automotive industry.

Hexion also operates a Hexamine manufacturing plant. The hexamine process operates infrequently, only serving as backup liquid hexamine production to a sister plant near Wilmington, NC. The Hexamine plant at Hexion has not operated since November 2011. The plant also previously produced a dry hexamine product. This dry process is no longer in operation.

The facility also has a wax emulsion plant (ID No. WAX). The facility receives raw wax product (called slack wax), then heats and blends the wax with various emulsifiers and additives. The mixture is homogenized and cooled. The emulsified wax is used in plywood and fiberboard manufacturing as a water repellant.

The plant wastewater is treated onsite at the wastewater treatment plant (ID No. WWTP) then discharged to Fayetteville's Public Works Commission.

3. History/Background/Application Chronology

Permit History since Last Permit Renewal

March 11, 2010	Title V permit renewed. Air Permit No. 03387T38 issued with a permit expiration date of January 31, 2015.
January 4, 2011	Title V Air Permit No. 03387T39 issued. The Case-by-Case MACT requirements were added for boilers ID Nos. ES3 and ES4 under this permit modification. Also, the facility's name was changed from Hexion Specialty Chemicals, Inc. to Momentive Specialty Chemicals, Inc.

March 11, 2012	Title V Air Permit No. 03387T40 issued. Under this minor modification, four new formaldehyde storage tanks were added to the permit and nine existing resin storage tanks and one overflow tank were removed.
March 30, 2013	Title V Air Permit No. 03387T41 issued. Under this minor modification, the permit was modified to allow the facility to manufacture urea-formaldehyde resins in the No. 4 batch reactor (ID No. BR4) in addition to the phenol-formaldehyde resins the reactor produces.
September 16, 2013	Title V Air Permit No. 03387T42 issued. Under this minor modification, three storage tanks and one feed tank were added to the permit and six existing storage tanks were removed.
February 6, 2015	Title V Air Permit No. 03387T43 was issued with an expiration date of January 31, 2020. The facility's name was changed to Hexion, Inc. – Fayetteville Facility under this modification. Air Permit No. 03387T43 will expire on the earlier of January 31, 2020 or the date the renewal of permit 03387T42 has been issued or denied.

Application Chronology

April 25, 2014	Received application for permit renewal.
April 15, 2014	Sent acknowledgment letter indicating that the application for permit renewal was complete.
May 8, 2014	Received comments from the Fayetteville Regional Office (FRO) on the permit application.
May 29, 2104	Betty Gatano and Nancy Jones from Raleigh Central Office and Greg Reeves from the FRO participated in a tour of the facility with Michelle West, Environmental Leader at Hexion, and Kevin Morris, Site Leader.
Aug. & Sep. 2014	Ms. Gatano and Ms. West exchanged several e-mails and phone calls on the permit and the operations at Hexion.
September 17, 2014	Draft permit and permit review forwarded for comments.
September 29, 2014	Comments received from Greg Reeves from FRO.
October 7, 2014	Ms. West called and provided comments on the draft permit and permit review.
October 7, 2014	Received permit application No. 2600009.14B for a minor modification of the permit for the following changes: • Replace the current catalytic oxidizer (ID No. CD17) used to control emissions from the mixed oxide catalyst formaldehyde plant (ID No. ES16). • Permit the storage of 50% formaldehyde in the current urea formaldehyde concentrate (UFC) storage tanks (ID Nos. MOSTORE1A, MOSTORE1B, and MOSTORE1C).

- Permit the storage of UFC and hydrolyzed re-work resin in two 50 %wt formaldehyde storage tanks (ID Nos. MOSTORE1D and IE) and the 50 %wt formaldehyde or water/wastewater storage tank (ID No. MOSTORE2).
- Permit unloading and storage of sodium lignosulfonate and glycerin solution in the temulose/ beet molasses work tank (ID No. ITBT).
- Increase the rate at which urea is transferred through the urea weighing and conveying operations (ID Nos. UWC1, UWC2, ES24, and ES26).

October 8, 2014 — Revisions to MACT Subpart OOO were published in the Federal Register. These changes include setting emission standards for pressure relief devices that are subject to MACT Subpart OOO and eliminating the exemption periods of startup, shut down, and malfunction, such that the emissions standards apply at all times. These changes will be incorporated in the renewed/modified permit.

October 9, 2014 — DAQ issued an acknowledgement letter allowing Hexion to implement the changes proposed in permit application No. 2600009.14B immediately, provided the facility complied with both the applicable requirements governing the changes and the proposed permit terms and monitoring, recordkeeping, and reporting conditions identified in the application.

October 20, 2014 — Ms. Gatano sent an e-mail to Ms. West requesting that the minor modification permit application be consolidated with the application for permit renewal. This consolidation should not cause a delay in implementing the changes to the permit because the acknowledgement letter allowed the facility to implement the proposed changes. No response was received.

November 19, 2014 — Ms. Gatano sent a second e-mail to Ms. West requesting that the minor modification permit application be consolidated with the application for permit renewal. Ms. West responded via e-mail on November 25, 2014 and indicated that consolidation is acceptable.

November 25, 2014 — Permit Application No. 2600009.14B was consolidated with permit application No. 2600009.14A.

February 12, 2015 — Received permit application No. 2600009.15B for a minor modification. In the permit application, the facility proposes to permit the existing boilers ES3 and ES4 to fire No. 2 fuel oil. Also the permit is being modified to allow No. 2 fuel oil to be stored in the 36,000 gallon fuel oil storage tank (ID No. IFOST).

February 13, 2015 — DAQ Issued an acknowledgement letter allowing Hexion to implement the changes proposed in permit application No. 2600009.15B immediately, provided the facility complied with both the applicable requirements governing the changes and the proposed permit terms and

	monitoring, recordkeeping, and reporting conditions identified in the application.
March 13, 2015	Permit Application No. 2600009.15B was consolidated with permit application No. 2600009.14A.
April 7, 2015	An addendum to Permit Application No. 2600009.14B as received. The addendum proposed to add a previously unidentified heat exchanger (ID No. HX12).
April 10, 2015	A 502(b)(10) change letter received to relocate a storage tank to the wax plant. An e-mail of the letter was initially received on April 6, 2015.
April 14, 2015	Revised draft and permit review forwarded for comments.
July 2, 2015	Betty Gatano, Michelle West, and Taylor Loftis, consultant for the facility, discussed the facility's comments via phone call.
July 21, 2015	Betty Gatano had a follow up call with Taylor Loftis to clarify issues discussed in the call.
August 17, 2015	Betty Gatano followed up the call with an e-mail to Taylor Loftis requesting feedback on specific questions. Mr. Loftis responded with feedback that day.
November 20, 2015	The EPA finalized changes to the "NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters," 40 CFR 63 Subpart DDDDD, which affected boilers (ID Nos. ES3 and ES4) at Hexion. The draft permit condition was updated accordingly.
January 7, 2016	Third draft of permit and permit review sent out for comments.
January 14, 2016	Betty Gatano, Mark Cuilla, Greg Reeves, Taylor Loftis, and Michelle West participated in a conference call to discuss the most recent version of the permit. Michelle West requested language to be added regarding venting of certain tanks to the atmosphere during malfunction.
January 29, 2016	Michelle West e-mailed Betty Gatano a list of the tanks.
March 1, 2016	Betty Gatano sent Michelle West draft language for venting thanks to the atmosphere. Michelle indicated the language was satisfactory.
April 13, 2016	Betty Gatano and Michelle West discussed third revision of the draft. The facility's changes were minimal, and it was agreed the draft could be sent to public notice.
April 18, 2016	Draft permit and permit review sent to public notice.

4. Permit Modifications/Changes and TVEE Discussion

Because of its length, the table of changes is provided in Attachment 1. The list of changes to the Title V Equipment Editor is also lengthy and is provided in Attachment 2.

5. Emissions Associated with Permit Application No. 260009.1BC

Catalytic oxidizer

Hexion is proposing to replace the existing catalytic oxidizer (ID No. CD17) with a new unit of the same size and control efficiency to control HAP and VOC emissions from the mixed oxide catalyst formaldehyde plant (ID No. ES16). The new oxidizer will have a different metallurgy and different welding techniques in its construction to prevent corrosion of the unit. Because the control efficiency will be the same for the new unit, an increase in emissions is not anticipated. However, the facility will be required to test the new catalytic oxidizer upon start-up to verify compliance with 40 CFR Part 63, Subpart G and to re-establish operating parameters.

Urea Formaldehyde Concentrate Storage and 50% Formaldehyde Storage

Under this permit modification, Hexion is proposing to modify several storage tanks (ID Nos. MOSTORE 1A through MOSTORE 1E and MOSTORE 2) to increase storage flexibility at its facility. Tanks MOSTORE 1A, 1B, and 1C currently are permitted to store UFC and hydrolyzed re-work resins. This permit modification will allow 50% formaldehyde also to be stored in these tanks. Similarly, tanks MOSTORE 1D, 1E, and 2 currently are permitted to store 50% formaldehyde. With this permit modification, these tanks will also be permitted to store UFC and hydrolyzed re-work resins. In summary under this permit modification, storage tanks MOSTORE 1A through MOSTORE 1E and MOSTORE 2 will all be permitted to store 50% formaldehyde, UFC, and hydrolyzed re-work resin.

The facility's annual throughput of UFC, hydrolyzed re-work resin, 50% formaldehyde, and other materials will not change with the proposed project. Therefore, the annual emissions from the storage tanks are not anticipated to change. Similarly, Hexion is not changing the facility's capacity to fill tanks at any given time, and the hourly emissions will not change with the proposed modification.

Although the facility's annual throughput of these materials will not change with the proposed project, the modification will allow formaldehyde to be stored in the storage tanks MOSTORE 1A through 1C. For this reason, the potential emissions of formaldehyde were examined under this permit modification /renewal to ensure that the facility remains in compliance with NC Air toxics. These tanks are also subject to MACT Subpart G. North Carolina G.S. 143-215.107(a) exempts certain emission sources subject to federal regulations from NC Air Toxics regulations provided their emissions do not "present an unacceptable risk to human health," in accordance with G.S. 143-215. 107(b) as codified on May 1, 2014.

Emissions from storage tanks MOSTORE 1A through 1C and several other emission sources are controlled via two packed bed scrubbers (ID Nos. CD200A and CD200B) in series. Hexion has previously modeled for compliance with the NC Air Toxics, and formaldehyde emissions from the resin scrubber stack (CD200A/B) are limited to 0.85 lb/hr to ensure compliance with the acceptable ambient level (AAL) for formaldehyde. For this analysis, the maximum annual emissions of formaldehyde from sources emitting via the resin scrubber stack as reported in DAQ's emission inventory were determined as shown in the table below. The maximum emissions were then added to the potential emissions from the storage tanks MOSTORE 1A – 1E and MOSTORE 2 as reported in the permit application. The total emissions on a pound per hour basis remain below the permitted

limit, as shown in the table below, and the modification does not pose an unacceptable risk to human health.

Maximum Actual Formaldehyde Emissions (lb/yr)	Potential Formaldehyde Emissions from Storage Tanks MOSTORE 1A - 1E and MOSTORE 2) (lb/yr)	Total Formaldehyde Emissions (lb/yr)	Total Formaldehyde Emissions (lb/hr)	Permitted Formaldehyde Emissions (lb/hr)
6,769	438	7,207	0.82	0.85

Notes:

- Maximum emissions of formaldehyde from the emissions sources associated with the resin scrubber stack (CD200A/B) over the past five years occurred in year 2011.
- Hourly emissions were calculated assuming 8,736 hours per year as reported in IBEAM for 2011.
- Potential emissions of formaldehyde from the storage tanks were estimated as 133.88 lbs/yr for UFC storage and 303.95 lbs/yr for 50% formaldehyde storage.
- The emissions as presented in this table represent a conservative estimated of emissions, as the maximum actual emissions include emissions from tanks MOSTORE 1D, 1E and 2 and are also included in the potential formaldehyde emissions reported in the permit application. Consequently, emissions from these storage tanks are double counted in the above table.

Urea Weighing and Conveying

Hexion is proposing to increase the rate at which urea is transferred through the urea weighing and conveying operations (ID Nos. UWC1, UWC2, ES24, and ES26). This change may cause the hourly throughput to exceed 30 tons per hour, which will require that both equations for allowable particulate matter emissions under 02D .0515 be included in the permit. However, the annual throughput of urea will not increase under this modification. No change to the monitoring, recordkeeping, or reporting is required under 02D .0515, and continued compliance is anticipated.

Heat Exchanger

On April 7, 2015, Hexion submitted a permit amendment to add a previously unidentified heat exchanger to the permit. The heat exchanger (ID No. HX12) is a formaldehyde/cooling water plate and frame unit and is located in the formaldehyde production area, Plant 3 (ID No. FORM3). The heat exchanger is a closed loop unit, with no emission points to the atmosphere. It is subject to the leak detection and repair (LDAR) program for heat exchange systems under the "National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry," 40 CFR Part 63 Subpart F. The components (e.g., connectors, valves, etc.) associated with this unit are already included in the facility's component count and emission calculations. Hexion is currently monitoring and keeping records for the heat exchanger in accordance with the Hazardous Organic NESHAP (HON) requirements (i.e., MACT Subparts F, G, and H). This unit was simply inadvertently left off of the permit and will be added under this permit renewal/modification.

Insignificant Activities

Hexion is proposing to unload and store sodium lignosulfonate and a glycerin solution in the temulose/beet molasses tank (ID No. ITBT). Unloading and storage of these materials into the tank will not cause it to become a significant source of emissions. Emissions from the unloading of glycerin (ID No. ITUNL-GLY) and sodium lignosulfonate (ID No. ITUNL-SLS) are provided in the table below. Because the potential emissions from these sources are each less than five tons per year, these sources are considered insignificant activities because of size or production rate as defined under 15A NCAC 02Q .0503(8).

Emission Source ID	Potential Emissions of VOC (tpy)	Comments
ITUNL-GLY	0.43	The MSDS for the glycerin solution indicates it is composed of less than 1% methanol. Raoult's law was used to calculate the partial pressure of the methanol in the gas phase at the temperature of 115 F. The potential emissions were calculated using the ideal gas law based on the partial pressure of methanol.
ITUNL-SYS	--	According to the MSDS for sodium lignosulfonate solution, it is a non-hazardous, non-volatile aqueous solution. VOC emissions are not expected.

6. Emissions Associated with Permit Application No. 260009.15B

Hexion proposes to permit the existing boilers ES3 and ES4 to fire No. 2 fuel oil. Both boilers are currently permitted to fire natural gas and No. 4, No. 5, and No. 6 fuel oil. The facility routinely fires natural gas in these boilers and only fires fuel oil during periods of curtailment. No. 2 is being added because obtaining the higher number residual oils is becoming increasingly difficult for the company.

The equipment will not change as a result of the permit modification. The only change will be the emissions associated with the combustion of No. 2 fuel oil in boilers ES3 and ES4 and the storage of No. 2 fuel oil in the 36,000 gallon fuel oil tank.

The table below provides the potential emissions from the firing of No. 2 fuel oil and No. 6 fuel oil (which is currently permitted and represents worst case emissions) in boilers ES3 and ES4. As shown in the table, emissions from all criteria pollutants, except for carbon monoxide (CO), are expected to be less with the firing of No. 2 fuel oil. Further, the small increase in CO emissions is far lower than the significance level under Prevention of Significant Determination (PSD) rules and is of no regulatory concern.

Pollutant	Potential Emissions from Firing No. 2 Fuel Oil (tons/yr)	Potential Emissions from Firing No. 6 Fuel Oil (tons/yr)	Difference in Emissions when firing No. 2 Fuel Oil (tons/yr)
Particulate Matter	4.32	29.32	-25.00
PM10	1.31	23.82	-22.51
PM2.5	0.33	15.52	-15.19
Sulfur Dioxide	92.85	402.42	-309.57
Nitrogen Oxides	26.15	67.13	-40.98
Carbon Monoxide	6.54	6.10	0.44
Volatile Organic Compounds	0.26	0.34	-0.08

Notes:
- Emissions for No. 6 and No. 2 fuel oil were calculated using DAQ's "Fuel Oil Combustion Emission Calculator Revision G" (11/05/2012).
- Sulfur dioxide emissions were calculated assuming a sulfur content of 2.1% for No. 6 fuel oil and 0.50% for No. 2 fuel oil.
- The permit application included different emission factors and associated emissions for some pollutants.

The addition of No. 2 fuel oil to the boilers is a modification to the permit. As specified 02Q .0702(a)(18) combustion sources that are modified after July 10, 2010 lose their exemption from NC Air Toxics. However, these boilers are also subject to the Case-by-Case MACT standards as discussed in Section 8 below. North Carolina G.S. 143-215.107(a) exempts certain emission sources subject to federal regulations – including sources subject to the Case-by-Case MACT standards – from NC Air Toxics regulations provided their emissions do not "present an unacceptable risk to human health," in accordance with G.S. 143-215. 107(b) as codified on May 1, 2014.

The emissions of toxic air pollutants (TAPs) from the firing of No. 2 fuel oil in these boilers were compared to the emissions of firing No. 6 fuel oil to ensure that the addition of No. 2 fuel oil does not pose an unacceptable risk to human health. Emissions of arsenic, chromium, nickel metals, and xylene were higher for the firing of No. 6 fuel oil than for No. 2 fuel oil and were not considered further in this analysis. Emissions for the other TAPs associated with combustion of No. 2 fuel oil are shown in the following table. Potential emissions for all the TAPs were below their toxics permitting emission rate (TPERs), with the exception of cadmium and beryllium. The TPERS would be exceeded for these TAPs if Hexion fired No. 2 fuel oil for 8,760 hours per year. In actuality, the facility will be burning No. 2 fuel oil only for periods of natural gas curtailment. As a worst case, it was assumed that curtailment would last a month or 31 days (744 hours). With this assumption, none of the TAPs associated with the change to No. 2 fuel oil exceeds its associated TPER, and thus, the modification does not pose an unacceptable risk to human health.

TAPS	Projected Emissions				TPERS		
	lb/hr	lb/day	lb/yr (assuming 8760 hours)	lb/yr (assuming 744 hours)	lb/hr	lb/day	lb/yr
Benzene	8.2E-04	2.0E-02	7.2	0.61			8.1
Beryllium	1.3E-04	3.0E-03	1.1	0.09			0.28
Cadmium	1.3E-04	3.0E-03	1.1	0.09			0.37
Fluorides	0.011	0.27	97.6	8.29	0.064	0.34	
Formaldehyde	0.014	0.344	125.5	10.7	0.04		
Mercury, vapor	1.3E-04	0.0030	1.1	0.09		0.013	
Methyl chloroform	7.0E-05	1.7E-03	0.6	0.05	64	250	
Toluene	2.4E-02	5.7E-01	208.4	17.7	14.4	98	

Notes:
- Emissions for No. 6 and No. 2 fuel oil were calculated using DAQ's "Fuel Oil Combustion Emission Calculator Revision G" (11/05/2012).
- The 31 days (744 hours) of operation is a conservative estimate for operation only during curtailment.
- The permit application included different emission factors and emissions for some pollutants.

Emissions from the storage of No. 2 fuel oil in tank IFOST were estimated using the EPA's TANKS 4.0. Program. Emissions of VOC from the tank will increases by 74.3 pounds per year as a result of this modification. This small increase in VOC emissions is far lower than the significance level under the PSD rules and is of no regulatory concern.

7. 502(b)(10) Change

On April 10, 2015, the DAQ received notification of a 502(b)(10) change at the Hexion facility. The change involves emptying a liquid hexamine storage tank (ID No. ESLH2) and relocating it to the wax production process area. The tank will be renamed Tank 4201 and will store triglyceride/oils of mixed fatty acids (beef tallow), slack wax or emulsified wax. Beef tallow and wax emulsions do not contain VOCs, HAPs or TAPs. The slack wax can contain trace amounts of toluene in amounts of 10 to 200 ppm (max, 0.02 wt%). Potential emissions from toluene based on this concentration and maximum throughput of slack wax is calculated as shown below:

Toluene emissions = 0.0002 lbs of toluene emitted/lb of slack wax * 3,700 lbs of slack was/hour
Toluene emissions = 0.74 lbs/hr
Toluene emissions = 0.74 lb/hr * 8760 hr/year = 6,482 lbs/yr
Toluene emissions = 3.24 tons/yr.

When the tank was storing liquid hexamine it was considered a Group 2 storage vessel under the HON. After completion of the relocation project, it will no longer be subject to the HON. Although the wax plant (ID No. WAX) is subject to the NESHAP for Miscellaneous Organic Chemical Manufacturing, 40 CFR Subpart FFFF (also called the MON), this storage tank will not meet the definition of a storage tank under MACT Subpart FFFF, because it will only store liquids with trace amounts of HAP impurities. As specified in 40 CFR 63.2250(i), a storage tank means the following:

> Storage tank means a tank or other vessel that is used to store liquids that contain organic HAP and/or hydrogen halide and halogen HAP and that has been assigned to an MCPU according to the procedures in §63.2435(d). The following <u>are not considered storage tanks</u> for the purposes of this subpart:
> (1) Vessels permanently attached to motor vehicles such as trucks, railcars, barges, or ships;
> (2) Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere;
> (3) Vessels storing organic liquids that contain HAP only as impurities;
> (4) Wastewater storage tanks;
> (5) Bottoms receivers;
> (6) Surge control vessels; and
> (7) Process tanks.

Hexion began using slack wax with the small amount of toluene in its wax plant (ID No. WAX) in 2013. The wax plant is subject to the MON and is exempt from NC Air Toxics per 02Q .0702(b)(27). Because the relocated storage tank (ID No. 4201) in the wax plant is not subject to a MACT standard, emissions from the tank must be evaluated to ensure that they can comply with NC Air toxics regulations. The highest emissions of toluene in the last five years as reported in the emission inventory occurred in 2013. These emissions were added to the potential emissions of TAPs from the wax plant, including tank 4201. The resulting emissions were compared with the TPERS as shown in the table below. Toluene emissions remain below the TPERS and compliance with NC Air Toxics is demonstrated. A permit condition addressing compliance with NC Air Toxics under 02Q .0711 will be added to the permit.

Pollutant	Highest Actual Emissions	Potential Emissions from Storage Tank	Total Emissions			TPERS		
	lb/yr	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr
Toluene	1,237	6,482	0.88	21	7,719	14.4	98	

Notes:
- Emissions of toluene were calculated assuming a maximum 0.02 wt% of toluene in the slack wax and a maximum throughput of slack wax at 3,700 lbs/hr (32,412,000 lbs/yr) provided in the permit application.
- Highest emissions of toluene over the last five years occurred in 2013.
- The wax plant was assumed to operate 8760 hours per year.

8. Applicable Regulations

Hexion is subject to the regulations listed below on a source-by-source basis. Regulations that are applicable to multiple emission sources and those that are applicable facility-wide are discussed below is Section 9. The permit will be updated to reflect the most current stipulations for all applicable regulations.

A. Silver Catalyst Formaldehyde Processes
- Closed vent system (ID No. CVS1)
- Silver catalyst formaldehyde process (ID No. FORM12) venting as fuel gas to Plant 1 and 2 boiler and/or Plant 3 boiler (ID Nos. CDB1 and CDB2)
- Silver catalyst formaldehyde process (ID No. FORM3) venting as fuel gas to Plant 3 boiler (ID No. CDB2)

The three older formaldehyde manufacturing plants (1956, 1963, and 1965) produce formaldehyde blends by reacting vaporized methanol with air as it is passed over a thin silver catalyst bed and then scrubbing the resulting gas with water. Formaldehyde Plants No. 1 and No. 2 (ID No. FORM12) are integrated to operate simultaneously. For each plant, tail gas emissions consisting primarily of hydrogen gas are captured and vented to a boiler – either the Plant 1 and 2 boiler (ID No. CDB1, 12.4 million Btu/hr) or the Plant 3 boiler (ID No. CDB2, 20.9 million Btu/hr). Plant 3 (ID No. FORM3) is operated independently from the other two silver catalysts plants. The tail gas from Plant 3 is fired only in the Plant 3 boiler. Except for start-up, supplemental fuel is not required for these boilers.

Emissions from tanks (ID Nos. STORE1MAF1, STORE1MAF2, STORE1FORM1 through STORE1FORM9), transfer operations (ID Nos. RLOAD1, RLOAD2, and TLOAD1A), and distillation columns (ID Nos. CFR12 and CFRT3) associated with the silver catalyst formaldehyde processes are collected via the closed vent system (ID No. CVS1) and returned to the formaldehyde processes (ID Nos. FORM12, FORM3, and ES16) as raw material feed.

- 15A NCAC 02D .0503, Particulates from Fuel Burning Indirect Heat Exchangers – The Plant 1 and 2 boiler (ID No. CDB1) and the Plant 3 boiler (ID No. CDB2), which are used as control devices on the silver catalyst formaldehyde processes (ID Nos. FORM12 and FORM3), are subject to this rule. Allowable PM emissions are determined from the equation, $E = 1.090(Q)^{-0.2594}$, where E equals the allowable emission limit for PM in pounds per million Btu and Q equals the maximum heat input in million Btu per hour. The allowable PM emission limit for these boilers is provided in the following table. Note that Boiler No. 5 (8.4 million Btu/hr) has since been removed from the facility. As stated under 02D .0503(e), "the removal of a fuel burning indirect heat exchanger shall not change the allowable emission

limit of any fuel burning indirect heat exchanger whose allowable emission limit has previously been established."

Emission Source	Heat Input of the Emission Sources (million Btu/hr)	Maximum Heat Input (million Btu/hr)	Emission limit (lb/million Btu)
Plant 1 and 2 boiler (ID No. CDB1)	12.4	83.5	0.35
Plant 3 boiler (ID No. CDB2)	20.9		
Boiler No. 5 (Boiler has since been removed from the facility).	8.4		
Boiler No. 3 (ID No. ES3)	20.9		
Boiler No. 4 (ID No. ES4)	20.9		

The formaldehyde plant tail gas is a clean light gas that produces little, if any, particulate emissions. The emission factor for PM from the combustion of natural gas or propane is 0.007 pounds per million Btu as provided in the DAQ spreadsheet.[2] No monitoring, recordkeeping, and reporting are required to ensure compliance for this rule.

Under Air Permit No. 03387T41 issued on May 30, 2013, the emission limit was replaced with the equation for 02D .0503. The reason for this change to allow additional boilers to be added under a 502(b)(10) notification. However, it is not appropriate in this situation, and the permit will be modified under this permit renewal/modification to specify the emission limit rather than the equation. Continued compliance is expected.

- 15A NCAC 02D .0516, Sulfur Dioxide from Combustion Sources - The Plant 1 and 2 boiler (ID No. CDB1) and the Plant 3 boiler (ID No. CDB2), which are used as control devices on the silver catalyst formaldehyde processes (ID Nos. FORM12 and FORM3), are subject to this rule. Tail gas from the processes is the primary fuel for these boilers, with natural gas, and/or propane used as supplemental fuel or upon process startup. No monitoring, recordkeeping, or reporting is required because of the low sulfur content of these fuels, which are inherently low enough in sulfur that continued compliance is expected. No changes are required under this permit renewal/modification.

- 15A NCAC 02D .0521, Control of Visible Emissions - The Plant 1 and 2 boiler (ID No. CDB1) and the Plant 3 boiler (ID No. CDB2), which are used as control devices on the silver catalyst formaldehyde processes (ID Nos. FORM12 and FORM3), are subject to this rule. These boilers were manufactured as of July 1, 1971 and must not have visible emissions of more than 40 percent opacity when averaged over a six-minute period, except as specified in 15A NCAC 02D .0521(c). Due to the low visible emissions associated with tail gas and natural gas/propane firing, no visible emissions are anticipated. No monitoring, recordkeeping, or reporting is required, and continued compliance is expected.

- 15A NCAC 02D .1111, MACT – These emission sources (ID Nos. FORM12, FORM3, and CVS1) are subject to the National Emission Standards for Organic Hazardous Air Pollutants (NESOHAP) from the Synthetic Organic Chemical Manufacturing Industry (SOCMI) for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. In accordance with 40 CFR 63.113(a)(2), the facility is required to reduce emissions of total organic hazardous air pollutants by 98 weight percent or to a concentration

[2] Natural gas emission factor is from the DAQ's "Natural Gas Combustion Emission Calculator Revision K" (06/19/2012).

of 20 ppmv, whichever is less stringent. The tail gas-fired boilers (ID Nos. CDB1 and CDB2) on the silver catalyst formaldehyde processing plants (ID Nos. FORM12 and FORM3) are used to control tail gases from the affected Group I process vents via the closed vent system (ID No. CVS1). The tail gas, which is the primary fuel, is introduced into the flame zone. Pursuant to 40 CFR 63.114(a)(3), boilers/process heaters used to control process vent emissions that use the tail gas as a primary fuel are not required to install temperature monitoring equipment in the firebox. In addition, pursuant to 40 CFR 63.116(b)(2), no performance test is required for boilers used as a control device provided the tail gas is introduced to the firebox as the primary fuel or with the primary fuel as is the case for Hexion. Thus, no testing, monitoring, recordkeeping or reporting is required when the gaseous emissions are used as a fuel gas. Continued compliance is expected.

- 15A NCAC 02D .1111, MACT – These emission sources (ID Nos. FORM12, FORM3, and CVS1) are also subject to the following MACTs that are applicable to multiple emission sources. Please see Section 9 below for a discussion of these MACTs:
  - General Provisions for NESHAP, 40 CFR Part 63, Subpart A – The sources subject to the HON requirements (i.e., MACT Subparts F, G, and H) are subject to the start-up, shutdown, and malfunction procedures under 40 CFR Part 63, Subpart A.
  - NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Hexion has to comply with the maintenance wastewater requirements under 40 CFR 63.105.
  - NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G – Each vapor collection system and closed-vent system is subject to the leak detection and repair provisions of this subpart.

B. Metal Oxide Catalyst Formaldehyde Process

- Vent collection header for ES16 (ID No. CVS2)
- Metal oxide catalyst formaldehyde process (ID No. ES16) with catalytic oxidizer (ID No. CD17)

Formaldehyde plant No. 4 (1989) produces formaldehyde blends and urea formaldehyde concentrate through the direct oxidation of methanol to formaldehyde using molybdenum and iron oxide catalysts. The reaction occurs when a mixture of air and vaporized methanol pass into catalyst-packed reactor tubes. Emissions from the metal oxide catalyst formaldehyde process (ID No. ES16) are collected via the closed vent system (ID No. CVS2) and sent to a catalytic oxidizer (ID No. CD17). The oxidizer controls formaldehyde and methanol emissions, reducing total organic compounds (TOC) emissions by at least 98 weight percent.

- 15A NCAC 02D .0524, New Source Performance Standards (NSPS) - These emission sources (ID Nos. ES16 and CVS2) are subject to the following NSPS. See Section 10 for more discussion of NSPS.
  - Standards of Performance for VOC Emissions from the SOCMI Air Oxidation Unit Processes, 40 CFR Part 60, Subpart III.
  - Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After January 5, 1981, and on or before November 7, 2006, 40 CFR Part 60, Subpart VV.

- 15A NCAC 02D .1111, MACT – These emission sources (ID Nos. ES16 and CVS2) are subject to the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. In accordance with 40 CFR 63.113(a)(2), the facility is required to reduce emissions of total organic hazardous air

pollutants by 98 weight percent or to a concentration of 20 ppmv, whichever is less stringent. A catalytic oxidizer (ID No. CD17) is used to control off-gases/waste-gases from the affected Group I process vents via the closed vent system (ID No. CVS2) to meet this emission standard. Under the MACT, Hexion is allowed one excursion of the emission limit per semiannual reporting period. Each excursion beyond the allowed exception is considered a violation.

The metal oxide catalyst plant has two operating scenarios; one for production of formaldehyde and the other for UFC. Compliance is required under both scenarios. Testing to demonstrate compliance was conducted in September 2006. The testing results were approved by Mr. Gregg O'Neal, Stationary Source Compliance Branch (SSCB) in a memorandum dated January 4, 2008. The results indicate a 99.7% TOC (total organic carbon) mass reduction efficiency during formaldehyde production and 99.4% TOC mass reduction efficiency during UFC production. The results of the test are provided in the table below and demonstrate compliance with 40 CFR Part 63, Subpart G.

Pollutant	U.S. EPA Method	Formaldehyde Production 09-19-2006			Urea Formaldehyde Production 09-20-2006		
		Inlet Emission Rate (lb/hr)	Outlet Emission Rate (lb/hr)	Mass Reduction Efficiency (%)	Inlet Emission Rate (lb/hr)	Outlet Emission Rate (lb/hr)	Mass Reduction Efficiency (%)
TOC Total	TOC by M18	89.27	0.274	**99.7%**	130.40	0.80	**99.4%**

The inlet temperature was monitored during testing to establish parametric monitoring values to ensure compliance. The inlet temperature for the formaldehyde and urea formaldehyde production was established as 220°C and 240°C, respectively.

MACT Subpart G requires facilities using catalytic oxidizers for compliance with the emission limit to monitor temperature upstream and downstream of the catalyst and determine and maintain a temperature rise across the catalyst bed. Under Air Permit No. 03387T33 issued on August 7, 2007, the facility requested and was allowed to use alternative monitoring for the catalytic oxidizer, per 40 CFR 63.151(g). The permit condition for compliance with the Group 1 process vents under MACT Subpart G reflects the approved alternative monitoring. Hexion must monitor the temperature of the catalyst and check the activity of catalyst annually under the approved alternative monitoring.

Hexion has proposed to install a new catalytic oxidizer (ID No. CD17) under the permit modification. The unit will be a similar model, with different metallurgy and wielding techniques. The revised permit will require the facility to demonstrate compliance with the new catalytic oxidizer via emission source testing as specified in 40 CFR 63.116(c)(1) through 63.116(c)(4). Hexion will also be allowed to operate the catalytic oxidizer at temperatures lower than the average daily temperatures required by the permit during testing.

Under Air Permit No. 03387T36 issued on August 26, 2008, the facility was allowed to expand the metal oxide catalyst formaldehyde production operations and increase production by 26.5%. The increased production will be accomplished by the installation and operation of a methanol preheater and booster blower. The permit requires the facility to retest to demonstrate compliance with emission limits under MACT Subpart G with the installation of this equipment. To date, this equipment has not been installed. Because this testing has not

yet been performed, the testing requirement will remain in the permit under this permit renewal/modification.

- 15A NCAC 02D .1111, MACT – These emission sources (ID Nos. ES16 and CVS2) are also subject to the following MACTs that are applicable to multiple emission sources. Please see Section 9 below for a discussion of these MACTs:
  - General Provisions for NESHAP, 40 CFR Part 63, Subpart A – The sources subject to the HON requirements (i.e., MACT Subparts F, G, and H) are subject to the start-up, shutdown, and malfunction procedures under 40 CFR Part 63, Subpart A.
  - NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Hexion has to comply with the maintenance wastewater requirements under 40 CFR 63.105.
  - NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G – Each vapor collection system and closed-vent system are subject to the leak detection and repair provisions of this subpart.

C. Heat Exchangers Systems Subject to 40 CFR Part 63, Subpart F

- Six heat exchanger systems for formaldehyde process FORM12 (ID Nos. HX9A, HX9B, HXT5, HXE16, HXT1, and HXT2)
- Five heat exchanger systems for formaldehyde process FORM3 (ID Nos. HX2, HX6, HX7C, HX8, and HX12)
- Five heat exchanger systems for formaldehyde process ES16 (ID Nos. HX7, HX8A, HX8B, HX10, and HX11)
- One heat exchanger system for hexamine process (ID No. HX5)

These sources are noncontact heat exchangers whose cooling water may become contaminated with process fluids containing HAPs that would ultimately be released to the atmosphere should there be a leak between the two fluid systems. Systems whose process fluid could become contaminated with the cooling water in the event of a leak are not covered.

Hexion has other heat exchange systems located at the site. These are not subject to MACT Subpart F because either they have been modified to increase coolant pressures such that the coolant is leaked to the process fluid or they are not in HAP service.

- 15A NCAC 02D .1111, MACT – The seventeen heat exchangers are subject NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F. Hexion has to sample the cooling water quarterly to detect leaks and repair any leaks detected in accordance with 40 CFR 63.104(d). The permit condition will be modified under this permit renewal/modification to add non-compliance statements. No other changes to the permit condition are required under this permit renewal/modification and continued compliance is anticipated.

- 15A NCAC 02D .1111, MACT – The seventeen heat exchangers are also subject to the following MACT that is applicable to multiple emission sources. Please see Section 9 below for a discussion of this MACT:
  - NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Hexion has to comply with the maintenance wastewater requirements under 40 CFR 63.105.

D. Emission Sources Subject to Leak Detection and Repair Requirements (LDAR) under MACT Subpart H

- Methanol tanks and Silver Catalyst Formaldehyde Process Areas - Pumps, agitators, pressure relief devices, open-ended valves or lines, valves, connectors, instrumentation systems, compressors, and sampling connection systems (ID No. FORMEQLK)
- Metal Oxide Catalyst Formaldehyde Process Area (ID No. ES16) - Pumps, agitators, pressure relief devices, open-ended valves or lines, valves, connectors, instrumentation systems in VOC service, compressors, sampling connection systems in VOC service and subject to 40 CFR Part 60, Subpart VV.
- Hexamine Production Equipment Group - Pumps, agitators, pressure relief devices, open-ended valves or lines, valves, connectors, and instrumentation systems, compressors, and sample connection systems (ID No. HEXAEQLK)

These sources are process equipment containing gases, vapors, or fluids with at least five percent by weight organic HAP content.

- 15A NCAC 02D .1111, MACT – These emission sources are subject to the NESOHAP for Equipment Leaks, 40 CFR Part 63, Subpart H. The regulation contains specific procedures for leak detection and repair of process equipment in HAP service to prevent HAPs from entering the environment via leaking equipment including pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or closed vent system systems required by MACT Subpart H. The equipment is subdivided in the permit into process groups for the intent of maintaining separate monitoring and recordkeeping requirements for each group. Hexion is required to monitor all equipment via instrumentation, visual inspection, or both. The frequency of monitoring depends on the type of equipment as shown in the table below. Further, Hexion must maintain records of all visual and instrument monitoring, leaking equipment, and repairs. Leaks and leak repairs are reported.

Type of Equipment	Monitoring Frequency
Pumps in light liquid	Monitored by instrument monthly. Monitored visually weekly.
Pressure relief devices	As needed - The emission standard requires an instrument reading of less than 500 ppm above background.
Open ended valve or lines	As needed – each opened valve or line shall be sealed at all times except at times listed in rule.
Valves in gas/vapor/light liquid service	The facility has to monitor according to the following scheduled based on the percentage of valves leaking: Two percent or greater leaking – monitor monthly < two percent leaking – monitor quarterly <1 percent leaking – monitor every two quarters < 0.5 percent leaking – monitor every four quarters.
Pumps, valves, etc. in heavy liquid services	These sources are to be monitored within 5 calendar days if evidence of a potential leak to the atmosphere is found by visual, audible, olfactory, or any other detection method.
Agitators in light liquid service	Monitored by instrument monthly. Monitored visually weekly.
Connectors in gas/vapor liquid service	The facility has to monitor according to the following scheduled based on the percentage of valves leaking: >0.5 percent leaking – once per year <0.5 percent leaking – once every 2 years initially and then once every 4 years (with at least 20 percent of the valves connectors inspected annually) provided the leaking equipment remains less than 0.5 percent.

Type of Equipment	Monitoring Frequency
Compressors	As needed - Each compressor has to be equipped with a seal system that includes a barrier fluid system and that prevents leakage of process fluid to the atmosphere, except as indicated in the rule. The compressor must be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.
Sampling connection systems	As needed - Each sampling connection equipment shall be equipped with a closed-purge, closed-loop or closed vent system.

Hexion has no compressors, sampling connection systems, surge tanks, bottoms receivers, or closed vent systems (i.e., those required by MACT Subpart H) that qualify as affected equipment. However, the LDAR requirements are included for compressors and sampling connection systems to enable them (if so desired) to be added at a later date without permit revision. Addition of any surge vessels, bottoms receivers, or closed vent systems required by MACT Subpart H is expected to require a permit modification.

The group of equipment within the metal oxide formaldehyde process (ID No. ES16) is subject to the 40 CFR Part 60, Subpart VV, as noted above. As specified under 40 CFR 63.160(b)(1), equipment that is also subject to 40 CFR Part 60 only has to comply with the LDAR provisions under MACT Subpart H.

The permit condition will be modified under this permit renewal/modification to add non-compliance statements. No other changes to the permit condition are required under this permit renewal/modification and continued compliance is anticipated.

- 15A NCAC 02D .1111, MACT – These emission sources are also subject to the following MACT that is applicable to multiple emission sources. Please see Section 9 below for a discussion of this MACT:
  - NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Hexion has to comply with the maintenance wastewater requirements under 40 CFR 63.105.

E. Urea Storage, Handling, and Conveying

- Formaldehyde Production
  - Urea water tank with cyclone separator (ID No. UW1) with cartridge filter (ID No. CD-UWBH)
  - Urea water tank with cyclone separator (ID No. UW2) with cartridge filter (ID No. CD-UWBH)
- Resin Production
  - Urea weighing and conveying for BR2 (ID No. ES24) with fabric filter (ID No. CD24)
  - Urea weighing and conveying for BR2 and BR3 (ID No. UWC1) with fabric filter (ID No. CDBF1)
  - Urea weighing and conveying for BR3 (ID No. UWC2) with fabric filter (ID No. CDBF2)
  - Urea weighing and conveying for BR4 (ID No. ES26) with fabric filter (ID No. CD26)

These are operations involving non-HAP compounds. Cartridge or fabric filters control particulate matter (PM) emissions from these processes.

- 15A NCAC 02D .0515, Particulates from Miscellaneous Industrial Processes - This regulation limits PM emissions based on the weight of the material processed according to the following equations:

For process rates up to 30 tons per hour
$E = 4.10 \times P^{0.67}$

For process rates greater than 30 tons per hour
$E = 55.0 \times P^{0.11}$

Where E = allowable emission rate in pounds per hour
P = process weight in tons per hour

Under the permit modification, the rate at which urea is transferred/conveyed will be increased to allow Hexion to operate the weighing and conveying systems at varying rates, including rates above 30 tons per hour, according to process demands. The equation for allowable emissions based on a process weight greater than tons per hour was added under this permit renewal/ modification.

These sources operate in a batch mode and emit particulates. Compliance with the particulate limits are achieved with cartridge or fabric filter control. The facility visually inspects the baghouses and ductwork monthly for leaks and structural integrity. Continued compliance is expected.

Typically, compliance with 02D .0515 requires annual inspections of the internal structures of the baghouse as well as monthly external inspections. The permit for Hexion has no such requirements. Plant personnel indicated that internal inspections of these baghouses are not technically feasible because they are elevated emission sources and/or do not have access ports. Additionally, no compliance issue has been noted by the facility or DAQ personnel. Annual internal inspections are required to ensure compliance, and no change to the permit condition is necessary under this permit renewal/modification.

- 15A NCAC 02D .0521, Control of Visible Emissions – These emissions sources were manufactured after July 1, 1971 and must not have visible emissions of more than 20 percent opacity when averaged over a six-minute period, except as specified in 15A NCAC 02D .0521(d). Compliance with the visible emission limit is achieved with the use of control equipment. Hexion conducts monthly visible emission observation to ensure compliance. The condition was updated to reflect the most current permitting language under this permit renewal/modification. Continued compliance is expected.

F. <u>Equipment Subject to 40 CFR Part 63, Subpart G, Group 2 Process Vents, Storage Vessels, Transfer Operations, and Wastewater Operations</u>
- Hexamine Reactor (ID No. HRE)
- Formaldehyde Plant No. 3 De-acidifier (ID No. FORM3)
- Group 2 Storage Tanks
  - Distillation column raw product feed tanks for formaldehyde processes (ID Nos. CFR12 and CFR3)
  - Two methaform / wastewater storage tanks (ID Nos. STORE1MAF1 and STORE1MAF2)
  - Nine formaldehyde / wastewater storage tanks (ID Nos. STOREFORM1 through STORE1FORM9)
  - 50% formaldehyde, UFC, and hydrolyzed re-work resin storage tank (ID No. MOSTORE 2) vented to scrubbers (ID Nos. CD200A and CD200B) or to atmosphere when scrubbers (ID Nos. CD200A and CD200B) are not in operation

    - Seven formaldehyde (various blends)/methaform storage tanks (FORMSTG1 through FORMSTG7)
    - Three 50% formaldehyde, UFC, and hydrolyzed re-work resin storage tanks (ID Nos. MOSTORE 1A through MOSTORE 1C) vented to scrubbers (ID Nos. CD200A and CD200B) or to atmosphere when scrubbers (ID Nos. CD200A and CD200B) are not in operation
    - Two 50% formaldehyde, UFC, and hydrolyzed re-work resin storage tanks (ID No. MOSTORE 1D through MOSTORE 1E) vented to scrubbers (ID Nos. CD200A and CD200B) or to atmosphere when scrubbers (ID Nos. CD200A and CD200B) are not in operation
    - One distillation column raw product feed tank (ID No. CFRT3)
    - Three hexamine process water, defoamer, catalyst, and wastewater tanks (ID Nos. ESOT1, ESOT2, and ESOT3)
    - Two hexamine concentrate water, defoamer, catalyst, and wastewater tanks (ID Nos. ESCT1 and ESCT2)
    - One liquid hexamine, defoamer, catalyst, and wastewater tank (ID No. ESLH1)
    - Hexamine distillate, defoamer, catalyst, and wastewater tank (ID No. ESDS)
- Group 2 Transfer Racks
    - Railcar urea formaldehyde concentrate product load out (ID No. RLOAD3) vented to scrubbers (ID Nos. CD200A and CD200B) or to atmosphere when scrubbers (ID Nos. CD200A and CD200B) are not in operation
    - Tank truck urea formaldehyde concentrate product load out (ID No. TLOAD2A) vented to scrubbers (ID Nos. CD200A and CD200B) or to atmosphere when scrubbers (ID Nos. CD200A and CD200B) are not in operation
    - Tank truck hexamine load out (ID No. TLOAD3A)
    - Rail car hexamine load out (ID No. RLOAD4)

The permit was rearranged under this permit renewal/modification to include emission sources subject to 40 CFR Part 63, Subpart G, Group 2 Process Vents, Storage Vessels, Transfer Operations, and Wastewater Operations under one permit condition. The Hexamine Plant (1981) produces hexamethylenetetramine (also known as hexamine or hexa) via the reaction of anhydrous ammonia and formaldehyde. This emission source is subject to requirements for Group 2 process vents and wastewater operations. Other emissions sources subject to the provisions for Group 2 equipment are tanks used to store raw material, intermediates, recycle material, and/or final products, and loading racks used for shipping product and receiving raw materials.

- 15A NCAC 02D .1111, MACT – The hexamine reactor (ID No. HRE) is subject to the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. A Group 2 process vent under MACT subpart G means a process vent for which the vent stream flow rate is less than 0.005 standard cubic meters per minute, the total organic HAP concentration is less than 50 ppmv or the total resource effectiveness (TRE) index value, calculated according to 40 CFR 63.115, is greater than 1.0. Hexion calculated the TRE value for this HAP source at 401. Because the TRE is greater than 4.0, no control is required as specified under 40 CFR 63.113(e). Hexion has to comply with the recordkeeping and reporting requirements but has no other provisions of the MACT Subpart G provided the TRE remains above 4.0. Hexion must also report any TRE index changes as a result of process changes.

- 15A NCAC 02D .1111, MACT – The hexamine reactor (ID No. HRE) and the formaldehyde plant No. 3 De-acidifier are subject to the NESOHAP from the SOCMI for Process Vents,

Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. A Group 2 wastewater stream means any process wastewater stream that does not meet the definition of a Group 1 wastewater stream. Hexion has determined that the wastewater from these sources does not contain sufficient HAP content to classify it as Group 1 wastewater. Therefore, it is considered Group 2 wastewater and requires no treatment or control. The facility is required to maintain records of the flow and HAP concentrations determination and any process changes that might affected this determination. Hexion must also report any change in the "Group" designation as a result of process changes.

- 15A NCAC 02D .1111, MACT – These storage tanks (ID Nos. STORE1MAF1, STORE1MAF2, STOREFORM1 through STORE1FORM9, FORMSTG1 through FORMSTG7, MOSTORE 1A through MOSTORE 1E, MOSTORE 2, CFRT3, ESOT1, ESOT2, ESOT3, ESCT1, ESCT2, ESLH1, and ESDS) are subject to the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. These storage tanks have been identified as Group 2 storage vessels, meaning that they do not meet the criteria for design storage capacity and stored-liquid maximum true vapor pressure specified in Table 5 under MACT Subpart G for storage vessels at existing sources or in Table 6 for storage vessels at new sources. As specified in 40 CFR 63.119(a)(3) for Group 2 storage vessels, Hexion is only required to keep the storage vessel dimensions and capacity readily available. No other monitoring or recordkeeping is required.

  Under this permit modification, Hexion is proposing to modify storage tanks MOSTORE 1A through MOSTORE 1E and MOSTORE 2 to allow the storage of 50% formaldehyde, UFC, and hydrolyzed re-work resin. These storage tanks remain Group 2 storage tanks under the HON after this modification.

  Storage tanks MOSTORE 1A through MOSTORE 1E and MOSTORE 2 are currently controlled via pack bed scrubbers (ID Nos CD200A and CD200B), even though controls are not required under the MACT Subpart G for Group 2 storage tanks (40 CFR 63.119(a)(3)). The facility has requested that these tanks be allowed to vent to atmosphere when the scrubbers are not in operations. Hexion will not load material into the tanks when the scrubbers are down for planned maintenance, inspection, etc. Venting to the atmosphere is intended only when the scrubbers are shut down for an unforeseen event, such as a power outage. This change will be made under the permit renewal/modification.

- 15A NCAC 02D .1111, MACT – These transfer operations (ID Nos. RLOAD3, TLOAD2A, TLOAD3A, and RLOAD4) are subject to the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. These transfer operations have been identified as Group 2 transfer operations, meaning that they annually load less than 0.65 million liters of liquid products that contain organic hazardous air pollutants with a rack weighted average vapor pressure greater than or equal to 10.3 kilopascals. As specified in 40 CFR 63.126(c) for Group 2 transfer operations, Hexion is required to keep the analysis demonstrating the design and actual annual throughput of the transfer rack, documentation of the weight-percent organic HAP's in the liquid loaded (e.g., analyses of the material and engineering calculations), and an analysis documenting the annual rack weighted average HAP partial pressure of the transfer rack. No other provisions for transfer racks apply to the Group 2 transfer rack.

  Transfer operations RLOAD3 and TLOAD2A are currently controlled via pack bed scrubbers (ID Nos CD200A and CD200B), even though controls are not required under the

MACT Subpart G for Group 2 transfer operations (40 CFR 63.126(c)). The facility has requested that these transfer operations be allowed to vent to atmosphere when the scrubbers are not in operations. Hexion will not transfer material when the scrubbers are down for planned maintenance, inspection, etc. Venting to the atmosphere is intended only when the scrubbers are shut down for an unforeseen event, such as a power outage. This change will be made under the permit renewal/modification.

G. Resin Production

- Aggregate Batch Vent Stream (ID No. CVS3) consisting of
  - three reactors (ID Nos. BR2, BR3, and BR4) with wet scrubbers (ID Nos. CD200A and CD200B)
  - three distillate receiving tanks (ID Nos. BR2DRT, BR3DRT, and BR4DRT) with wet scrubbers (ID Nos. CD200A and CD200B) on:
  - a weigh tank (ID No. FWTBR2) with wet scrubbers (ID Nos. CD200A and CD200B)
- Non-Reactor Batch Process Vent Stream (NRBPV1) consisting of
  - RTU mix tank with filter (ID No. ES103) with particulate separator (ID No. CD-104PS) and wet scrubber (ID No. CD-104S)
- Three dry materials storage silos/weigh hopper (ID No. ES-RTUDM) with fabric filter (ID No. CD-RTUDC1)
- Two phenol tanks (ID Nos. PT1 and PT2)
- 30 resin/resin wash water storage tanks (ID Nos. RTF11 through RTF40)
- Resin/resin wash water/diethylene glycol / defoamer/catalyst storage tank (ID No. RTF9)
- Two liquid ring vacuum seal water tanks (ID Nos. VST2/3 and VST4) vented to scrubbers (ID Nos. CD200A and CD200B) or to atmosphere when scrubbers (ID Nos. CD200A and CD200B) are not in operation
- RTU wash water/resin storage tank (ID No. ES-103WW)

Most of the formaldehyde produced at Hexion is used in the formaldehyde resin production onsite. Batch reactors No. 2 and 3 (ID Nos. BR2 and BR3) produce urea formaldehyde resins. Batch reactor 4 (ID No. BR4), also called the swing reactor, produces both urea formaldehyde and phenol formaldehyde resins. Two wet scrubbers (ID Nos. CD200A and CD200B) are used to control HAP emissions from these reactors and the associated distillate receiving tanks and weigh tank.

The RTU mix tank (ID No. ES103) and associated control devices became operational on January 1, 2009. Resins containing phenol, methanol, and formaldehyde are mixed with water and dry raw materials (nut shell flour, wheat flour, and soda ash) in this non-reactor batch mixing tank. An inline process filter located after the tank removes solids from the generated product. Emissions are controlled by a particulate separator (ID No. CD-104PS) followed by a wet scrubber (ID No. CD-104S).

Three dry material storage silos (ID No. ES-RTUDM), which send material via screw conveyor to an associated hopper, also became operational on January 1, 2009. The hopper weighs the material and sends it to the RTU mix tank via screw conveyor. Particulate matter from the silos is controlled via a fabric filter (ID No. CD-RTUDC1).

Also, under this permit renewal/modification several tanks associated with resin production were moved from Section 2.1.K to 2.1.G so that all resin production equipment resides in one section of the permit. The intent of this change was to make the grouping of emission sources under each permit section more logical.

- 15A NCAC 02D .0515, Particulates from Miscellaneous Industrial Processes - The non-reactor batch process vent stream (ID No. NRBPV1), also called the vent collection header on the RTU mix tank, and the three dry material silos (ID No. ES-RTUDM) are subject to 02D .0515. This regulation limits PM emissions based on the weight of the material processed according to the equation, $E = 4.10 \times P^{0.67}$, where E = allowable emission rate in lbs/hr and P = process weight in tons/hr, for P < 30 tons/hr. Compliance with the particulate limits are achieved with cartridge or fabric filter control. The facility visually inspects the baghouses and ductwork monthly to ensure proper operation and structural integrity of the fabric filter (ID No. CD-RTUDC1).

  Typically, compliance with 02D .0515 requires an annual inspection of the internal structure of the baghouse as well as monthly inspections. The permit for Hexion has no such requirements. Plant personnel indicated that an internal inspection of this baghouse is not technically feasible because it is an elevated emission source. Additionally, no compliance issue has been noted by the facility or DAQ personnel. Therefore, annual internal inspections are required to ensure compliance, and no change to the permit condition is necessary under this permit renewal/modification.

  The permit does not require the facility to conduct monthly external visual inspections of the particle separator (ID No. CD-104PS) and wet scrubber (ID No. CD-104S) for compliance with 02D .0515. Plant personnel indicated that, based on the structure of this equipment, leakage of PM is not expected. Additionally, no compliance issue has been noted by the facility or DAQ personnel. For these reasons, no change to the permit condition is necessary under this permit renewal/modification.

- 15A NCAC 02D .0521, Control of Visible Emissions – The non-reactor batch process vent stream (ID No. NRBPV1) and the three dry material silos (ID No. ES-RTUDM) were manufactured after July 1, 1971 and must not have visible emissions of more than 20 percent opacity when averaged over a six-minute period, except as specified in 15A NCAC 02D .0521(d). Compliance with the visible emission limit is achieved with the use of control equipment. Hexion conducts monthly visible emission observations to ensure compliance. The condition was updated to reflect the most current permitting language under this permit renewal/modification. Continued compliance is expected.

- 15A NCAC 02D .1111, MACT – The aggregate batch stream (ID No. CV3) and the non-reactor process vent stream (ID No. NRBPV1) are subject to the NESHAP for Manufacture of Amino/Phenolic Resins, 40 CFR Part 63, Subpart OOO. The MACT requires organic HAP emissions from the batch reactors (via the aggregate batch stream ID No. CV3) to be reduced by 83 weight percent or to a concentration of less than or equal to 50 ppmv, whichever is less stringent, on a continuous basis. Organic HAP emissions from the non-reactor batch RTU mix tank (via the non-reactor process vent stream ID No. NRBPV1) must be reduced by 62 weight percent using a control device or control technology or to a concentration of less than or equal to 50 ppmv using a non-combustion control device.

  For the continuous batch reactors, Hexion achieves compliance with the use of two scrubbers. The first scrubber (CD200A) is a once through packed bed scrubber using city water designed to remove formaldehyde, methanol, and phenol emissions. The once through design maintains a constant fresh supply of scrubbing medium. A minimum liquid flow rate is required to ensure scrubber control. The second scrubber (CD200B) is an acidic scrubber that uses sulfuric acid added to the circulating medium designed to remove the triethylamine

emissions. MACT Subpart OOO requires that the facility establish and maintain a pH on the scrubber to ensure compliance. The first scrubber uses a constant fresh supply of scrubbing medium (once through city water) and therefore the pH does not need to be maintained. A pH level for the second scrubber is required.

Hexion conducted testing in June 2006 to demonstrate compliance with MACT Subpart OOO and establish monitoring parameters for the scrubbers. As shown in the table below, total HAP emissions reduction efficiency was 93.5% during testing, which is above the required 83% minimum. The testing also established the monitoring parameters for scrubbers CD200A and CD200B at a minimum liquid to gas ratio of 0.0049 gallons per dry cubic foot and a maximum pH of 4.9, respectively.

Pollutant	Unspiked Max Production 06-27-2006 (FG-472X)			Spiked Max Production 06-28-2006 (Spiking with Formaldehyde and Methanol)		
	Average Inlet Emission	Average Outlet Emission	Mass Reduction Efficiency (%)	Average Inlet Emission	Average Outlet Emission	Mass Reduction Efficiency (%)
Total HAP	14.8 lb/hr	0.950 lb/hr	**93.5%**	79.1 lb/hr	2.80 lb/hr	96.4%
Notes: Testing was performed during production of the highest HAP recipe. Spiked testing was conducted to allow for future resin operations flexibility.						

For the non-reactor RTU mix tank, Hexion achieves compliance with the MACT Subpart OOO with scrubber control. Wet scrubber CD104S is a once through packed bed scrubber using once-through city water and is designed to remove formaldehyde, methanol, and phenol emissions. The once through design maintains a constant fresh supply of scrubbing medium. The facility completed source testing of the scrubber on May 13-14, 2009, which demonstrated that maximum pre-controlled organic HAP emissions entering the scrubber are less than 1 ton per year. For devices controlling sources with potential HAP emissions below 1 ton per year, 40 CFR 63.1413(a)(2) allows monitoring to consist of only a daily or per batch verification that the control device is operating properly. This verification must include, but not be limited to, a daily or per batch demonstration that the control device is working as designed. Hexion monitors continuously with the option to perform batch verification that the liquid to gas ratio in the scrubber is greater than or equal to 0.042 gpm/scfm.

Revisions to MACT Subpart OOO were published in the Federal Register on October 9, 2014. The revisions include setting emission standards for pressure relief devices that are subject to MACT Subpart OOO. The revised MACT OOO requires that the facility monitor pressure relief devices in organic HAP service that release to the atmosphere by using a device or system that is capable of identifying and recording the time and duration of each pressure release and of notifying operators immediately that a pressure release is occurring. The facility is also required to keep records and report any pressure release and the amount of organic HAP released to the atmosphere with the next periodic report. Compliance with pressure release management provisions under 40 CFR 63.1411(c) is required by October 9, 2017. The compliance date for other requirements for the pressure relief devices is the effective date of the standard, October 8, 2014. The date was not extended because these requirements are the same as those contained in 40 CFR Part 63, Subpart UU, with which the facility is already complying as part of the existing MACT standards for Subpart OOO.

The revised MACT also eliminates the exemption periods of startup, shut down, and malfunction (SSM), such that the emissions standards apply at all times. The changes eliminate the periodic SSM reports as a stand-alone report and require sources that fail to meet an applicable standard at any time to report the information concerning such events in the semiannual periodic report already required under these rules. The report must contain the number, date, time, duration and cause of such events (including unknown cause, if applicable), a list of the affected source or equipment, an estimate of the quantity of each regulated pollutant emitted over any emission limit and a description of the method used to estimate the emissions. Further, the facility is no longer required to determine whether actions taken to correct a malfunction are consistent with an SSM plan, because plans are no longer required under the revised MACT.

The compliance date for existing sources to comply with the revised SSM requirements is the effective date of the standard, October 8, 2014. As indicated in the preamble to the final rule, the EPA selected this date because these requirements should be immediately implementable by the facilities upon the next occurrence of a malfunction

.

The permit was modified under this permit renewal/modification to account for the new requirements for pressure relief devices and changes to SSM requirements under MACT Subpart OOO.

- 15A NCAC 02D .1111, MACT – The aggregate batch stream (ID No. CV3) and the non-reactor process vent stream (ID No. NRBPV1) are also subject to the following MACTs that are applicable to multiple emission sources. Please see Section 6 below for a discussion of these MACTs:
  - General Provisions for NESHAP, 40 CFR Part 63, Subpart A – The sources subject to Resin MACT are also subject to the start-up, shutdown, and malfunction procedures under 40 CFR Part 63, Subpart A.
  - NESHAP for Manufacture of Amino/Phenolic Resins 40 CFR Part 63, Subpart OOO / NESHAP for Manufacture of Amino/Phenolic Resins 40 CFR Part 63, Subpart SS – These sources are subject to the closed vent and system equipment operating requirements under these MACTs.

H. <u>Process Equipment Subject to Equipment Leak Provisions under 40 CFR Part 63, Subpart OOO/UU</u>
Resin Production Process Area - Pumps, agitators, pressure relief devices, open-ended valves or lines, valves, connectors, instrumentation systems, compressors, and sampling connection systems in organic HAP service (ID No. BREQLK)

Equipment in organic hazardous air pollutant service means that the gases, vapors, or fluids contained in this equipment contain at least five percent by weight organic HAP.

- 15A NCAC 02D .1111, MACT – The resin production is subject to the leak detection requirements under NESHAP for Manufacture of Amino/Phenolic Resins 40 CFR Part 63, Subpart OOO. As specified in 40 CFR 63.1410 under MACT Subpart OOO, the facility must comply with the requirements of 40 CFR part 63, subpart UU, National Emission Standards for Equipment Leaks (Control Level 2) for all equipment, as defined under 40 CFR 63.1402, that contains or contacts 5 weight-percent HAP or greater and operates 300 hours per year or more. The affected equipment is subdivided in the permit into process groups for the intent of maintaining separate monitoring and recordkeeping requirements for each group. Hexion is required to monitor all equipment with instrumentation, by visual inspection, or both. The frequency of monitoring depends on the type of equipment as shown in the table below.

Further, Hexion must maintain records of all visual and instrument monitoring, leaking equipment, and repairs. Leaks and leak repairs are reported.

Type of Equipment	Monitoring Frequency
Pumps in light liquid	Monitored by instrument monthly. Monitored visually weekly.
Pressure relief devices	As needed - The emission standard requires an instrument reading of less than 500 ppm above background.
Open ended valve or lines	As needed – each opened valve or line shall be sealed at all times except at times listed in rule.
Valves in gas/vapor/light liquid service	Hexion has fewer than 250 valves and is allowed to monitor valves quarterly (rather than monthly) or annually depending on the frequency of leaks.
Pumps, valves, etc. in heavy liquid services	These sources are to be monitored within 5 calendar days if evidence of a potential leak to the atmosphere is found by visual, audible, olfactory, or any other detection method.
Agitators in light liquid service	Monitored by instrument monthly. Monitored visually weekly.
Connectors in gas/vapor liquid service	The facility has to monitor according to the following scheduled based on the percentage of valves leaking: >0.5 percent leaking – once per year <0.5 percent leaking – once every 2 years initially and then once every 4 years (with at least 20 percent of the valves connectors inspected annually) provided the leaking equipment remains less than 0.5 percent.
Compressors	As needed - Each compressor has to be equipped with a seal system that includes a barrier fluid system and that prevents leakage of process fluid to the atmosphere, except as indicated in the rule, The compressor must be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.
Sampling connection systems	As needed - Each sampling connection equipment shall be equipped with a closed-purge, closed-loop or closed vent system.

There were no compressors, sampling connection systems, surge tanks, bottoms receivers, or closed vent systems which qualify as affected equipment. However, leak provision requirements are included for compressors and sampling connection systems to enable them (if so desired) to be added at a later date without permit revision. Addition of any surge vessels, bottoms receivers, or closed vent systems is expected to require a permit modification.

I. Transfer operations (Subpart G – Group 1)

- Rail car methaform product load out (two loading arms; ID No. RLOAD1)
- Rail car formaldehyde product load out (two loading arms; ID No. RLOAD2)
- Tank truck formaldehyde mixed product load out (one loading arm; ID No. TLOAD1A)

This equipment meets the definition of Group 1 transfer racks under MACT Subpart G, which means a transfer rack that annually loads greater than or equal to 0.65 million liters of liquid products that contain organic HAP with a rack weighted average vapor pressure greater than or equal to 10.3 kilopascals. These loading racks exist at transfer stations and include multiple loading arms for various products, not all of which require controls as a Group 1 transfer operation. Hexion meets the control requirement by routing HAP emissions via a vapor collection system (ID No. CSV1) to the formaldehyde processes (ID Nos. FORM12, FORM3, and ES16).

- 15A NCAC 02D .1111, MACT – These emission sources are subject to the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. Hexion has to comply with the requirements for Group 1 transfer

operations under 40 CFR 40 CFR 63.126(a). Emissions from the transfer operations are routed to one of four formaldehyde production units to fulfill the control requirements for these sources in accordance with 40 CFR 63.126(b)(4). The transfers are limited to trucks meeting the DOT certifications for vapor tightness. There are no bypasses to the atmosphere for closed vent system except for emergency purposes. Reporting is not required.

- 15A NCAC 02D .1111, MACT – These emission sources are also subject to the following MACTs that are applicable to multiple emission sources. Please see Section 9 below for a discussion of these MACTs:
  - General Provisions for NESHAP, 40 CFR Part 63, Subpart A – The sources subject to the HON requirements (i.e., MACT Subparts F, G, and H) are subject to the start-up, shutdown, and malfunction procedures under 40 CFR Part 63, Subpart A.
  - NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Hexion has to comply with the maintenance wastewater requirements under 40 CFR 63.105.
  - NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. Each vapor collection system and closed-vent system are subject to the leak detection and repair provisions of this subpart.

J. Storage Tanks (Subpart G – Group 1)

- Internal floating roof methanol storage tank (ID No. METH1)
- Internal floating roof methanol storage tank (ID No. METH2)

These storage tanks are used to store methanol for the production of formaldehyde and for addition to various products as a stabilizer. Each tank is equipped with a fixed roof and an internal floating roof with dual seals.

- 15A NCAC 02D. 0524, New Source Performance Standards – These tanks are subject to Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, 40 CFR Part 60, Subpart Kb. These tanks are also Group 1 storage vessels under 40 CFR Part 63, Subpart G. As specified in 40 CFR 63.110(b)(1), a Group 1 storage vessel that is also subject to 40 CFR Part 60, Subpart Kb is required to comply only with the provisions in 40 CFR Part 63, Subpart G.

- 15A NCAC 02D .1111, MACT – These emission sources are subject to the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G. Hexion complies with the storage vessel requirements under 40 CFR 63.119 by maintaining a fixed roof with internal floating roof on each methanol tank. The facility conducts inspections of the roofs, recordkeeping, and reporting as required by the MACT. Continued compliance is expected.

- 15A NCAC 02D .1111, MACT – These emission sources are also subject to the following MACT that is applicable to multiple emission sources. Please see Section 9 below for a discussion of this MACT:
  - NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Hexion has to comply with the maintenance wastewater requirements under 40 CFR 63.105.

K. Other Emission Sources

Other Transfer Operations

- Truck load out station for urea formaldehyde resin (ID No. TLOAD6)
- Two tank truck urea formaldehyde resin and phenol formaldehyde resin load out stations (ID Nos. TLOAD1B and TLOAD2B)
- Tank truck urea formaldehyde resin and wax load out (ID No. TLOAD3B)
- Tank truck phenol formaldehyde resin load out, and receiving for caustic, temulose, beet molasses, and phenol (ID No. TLOAD4)
- Tank truck urea formaldehyde resin and phenol formaldehyde resin load out, and receiving of aqueous ammonia (ID No. TLOAD5)

Wastewater Treatment Plant (ID No. WWTP)

Under this permit renewal/modification, the permit was rearranged to move emissions sources that are involved in the same manufacturing processes (e.g., Resin Production) or that are subject to the same regulations (e.g., Group 2 operations under MACT Subpart G) to the same sections in the permit. The intent of this change was to make the grouping of emission sources under each permit section more logical. A few emission sources did not fit elsewhere in the permit and remained under Section 2.1.K. These sources include the wastewater treatment plant and some loading racks used for shipping product and receiving raw materials.

- 15A NCAC 02D .1111, MACT – The NESHAP for Organic Liquids Distribution (Non-Gasoline), 40 CFR Part 63 Subpart EEEE, applies to owners or operations or organic liquid distribution (OLD) operations that are a located at a major source of HAPs. Per 40 CFR 63.2338(c), MACT Subpart EEEE does not cover storage tanks, transfer racks, transport vehicles, containers, and equipment leak components that are an affected source under another 40 CFR Part 63 NESHAP. Thus, the only emission sources that are subject to this MACT are "all transfer racks at which as organic liquids are loaded into or unloaded out of transport vehicles and/or containers." Several insignificant activities, meet these applicability criteria.

  The only requirements for transfer racks that unload organic liquids is to keep up-to-date documentation that verifies that each transfer rack is not required to be controlled as specified in 40 CFR 63.2343 (a) and to submit an initial notification per 40 CFR 63.2382(b)(1). Hexion, previously submitted the initial notification for MACT subpart EEEE on June 2, 2006.

  Requirements for MACT Subpart EEEE will be added to the permit under this permit renewal/modification.

L. Two natural gas/ No. 2 fuel oil / No. 4 fuel oil / No. 5 fuel oil/ No. 6 fuel oil fired boilers (ID Nos. ES3 and ES4)

These are natural gas and residual oil-fired boilers used for process heat. Hexion routinely fires natural gas in these boilers and only fires fuel oil during periods of natural gas curtailment.

- 15A NCAC 02D .0503, Particulates from Fuel Burning Indirect Heat Exchangers – Allowable PM emissions are determined from the equation, $E = 1.090(Q)^{-0.2594}$, where E equals the allowable emission limit for PM in pounds per million Btu and Q equals the maximum heat input in million Btu per hour. Prior to Air Permit No. 03387R20 issued on

November 6, 2000, Borden (owners at that time) had one limit for all the combustion units at the facility. Under Air Permit No. 0338R20 separate limits under 02D .0503 were established for the plant boilers (ID Nos. ES3 and ES4) and tail gas-fired boilers. The limit for the tail gas-fired boilers was established as noted previously under Section 8.A. The allowable PM emission limit for the plant boilers is provided in the following table. Note that Boiler No. 5 (8.4 million Btu/hr) has since been removed from the facility. As stated under 02D .0503(e), "the removal of a fuel burning indirect heat exchanger shall not change the allowable emission limit of any fuel burning indirect heat exchanger whose allowable emission limit has previously been established."

Emission Source	Heat Input of the Emission Sources (million Btu/hr)	Maximum Heat Input (million Btu/hr)	Emission limit (lb/million Btu)
Boiler No. 5 (Boiler has since been removed from the facility).	8.4	50.2	0.39
Boiler No. 3 (ID No. ES3)	20.9		
Boiler No. 4 (ID No. ES4)	20.9		

Emission factors for each of the fuels burned are provided as follows:

- No. 2 fuel oil – 0.024 pounds per million Btu based on an emission factor for PM of 3.3 pounds per 10^3 gallons and a fuel heating value of 140,000 Btu/gallon.
- No. 4 fuel oil – 0.057 pounds per million Btu based on an emission factor for PM of 8.5 pounds per 10^3 gallons and a fuel heating value of 150,000 Btu/gallon.
- No. 6 fuel oil – 0.16 pounds per million Btu based on an emission factor for PM of 24.0 pounds per 10^3 gallons and a fuel heating value of 150,000 Btu/gallon.[3]
- Natural gas – 0.007 pounds per million Btu as provided in the spreadsheet.[4]

No monitoring, recordkeeping, and reporting are required to ensure compliance for this rule. Under Air Permit No. Permit 03387T41 issued on May 30, 2013, the emission limit was replaced with the equation for 02D .0503. This change is not appropriate, and the permit will be modified under this permit renewal/modification to specify the emission limit rather than the equation. Continued compliance is expected.

- 15A NCAC 02D .0516, Sulfur Dioxide Emissions from Combustion Sources – No monitoring or recordkeeping is required when firing natural gas or No. 2 fuel oil in the boilers. Fuel certification is required to ensure that the residual fuel oil fired in the boilers does not exceed 2.1 percent by weight sulfur. No changes are required under this permit renewal/modification.

- 15A NCAC 02D .0521, Control of Visible Emissions – These boilers were manufactured as of July 1, 1971 and must not have visible emissions of more than 40 percent opacity when averaged over a six-minute period, except as specified in 15A NCAC 02D .0521(c). No monitoring or recordkeeping is required when firing natural gas or No. 2 fuel oil in these boilers. Daily visible observations are required to ensure compliance with 02D .0521 when firing residual fuel oil in these boilers. The permit condition was updated to the current permit language under this permit renewal/modification. Continued compliance is anticipated.

[3] Emission factors for No. 2 fuel oil, No. 4 fuel oil, and No. 6 fuel oil are from the DAQ's "Fuel Oil Combustion Emission Calculator Revision E" (02/01/2010).
[4] Natural gas emission factor is from the DAQ's "Natural Gas Combustion Emission Calculator Revision K" (06/19/2012).

- 15A NCAC 02D .1109, Case-by-Case MACT – The Case-by-Case MACT requirements were added to the permit under Air Permit No. 03387T39 issued on January 4, 2011.[5] Under the Case-by-Case MACT, natural gas, No. 2 fuel oil, No. 4, No. 5, and No. 6 fuel oil-fired boilers (ID Nos. ES3 and ES4) must meet emission limits for PM, carbon monoxide (CO), and mercury (Hg) when firing at least 10% residual oil on an annual basis. For emissions from natural gas and natural gas, Hexion has to meet work practice standards for the boilers. As discussed in the review in support of that permit,[6] requirements under the Case-by-Case MACT are listed in the table below.

Boiler	Fuel-Fired	Requirements under the Case-by-Case MACT
ES3 and ES4	No. 4, No. 5, and No. fuel 6 oil	PM (filterable): 0.45 lb/Million Btu Hg: 2.0 E-5 lb/hr total for CO: 28 ppmvd, corrected to 7% oxygen
	No. 2 fuel oil and natural gas	Annual boiler inspections and maintenance and an annual tune-up

The emission limits for PM, CO, and Hg only apply if the boiler fires at least 10% residual oil on an annual basis. As indicated in an e-mail with Michelle West, Environmental coordinator for Hexion, the facility has not yet burned 10% on a 12-monthy average heat input basis. The facility has not yet had to meet the emission limits. Should they burn more than 10% residual oil, Hexion must conduct compliance testing within 180 days of the trigger date.

Hexion must comply with the Case-by-Case MACT standards for the applicable boilers until May 19, 2019. Beginning on May 20, 2019, the facility must comply with the standards for these boilers specified in "NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters," 40 CFR 63 Subpart DDDDD (MACT Subpart DDDDDD). This date was determined based on the promulgation date of MACT Subpart DDDDD, as per 15A NCAC 02Q .0526(o)(2), which states, in part, the following:

> *The Director shall establish a compliance date in the revised permit that assures that the owner or operator shall comply with the promulgated standard within a reasonable time, but no longer than eight years after such standard is promulgated or eight years after the date by which the owner or operator was first required to comply with the emission limitation established by permit, whichever is earlier.*

The permit incorrectly specifies that Hexion must comply with MACT DDDDD starting May 23, 2019. This date is incorrect and will be corrected under this permit renewal/modification to May 20, 2019.

- 15A NCAC 02D .1111, Maximum Achievable Control Technology – These boilers will become subject to MACT Subpart DDDDD beginning May 20, 2019. For the boilers to be considered to be in the units designed to burn gas 1 subcategory Hexion must only burn liquid fuel for periodic testing of liquid fuel, maintenance, or operator training, not to exceed a combined total of 48 hours during any calendar year, and during periods of gas curtailment or gas supply interruptions of any duration. Hexion must conduct a one-time energy assessment and annual boiler tune-ups for these boilers. The energy assessment and initial

[5] No. 2 fuel oil was not included when the Case-by-Case MACT requirements were initial added to the boiler, but it is being added under this permit renewal/modification.
[6] Jenny Kelvington (January 4, 2011).

tune-up must be completed by Mary 20, 2019. Notification, recordkeeping, and reporting are also required under this MACT. Requirements for MACT Subpart DDDDD will be added to the permit under this renewal/modification.

- 15A NCAC 02Q .0317, Avoidance Conditions – The permit contains avoidance conditions under for 15A NCAC 02D .0530, PSD, for SO2 and VOCs. More discussion on PSD avoidance is provided under Section 12.

M. Temporary,[7] back-up boiler (ID No. TB1) with a maximum heat input capacity of less than 30 million Btu per hour; formaldehyde process tailgas and natural gas-fired.

This boiler has not yet been required for service. It is a temporary back-up boiler with a maximum heat input less than 30 million Btu per hour. If used, it will combust formaldehyde process tail gas and/or natural gas and be subject to the HON.

- 15A NCAC 02D .0503, Particulates from Fuel Burning Indirect Heat Exchangers – Allowable PM emissions are determined from the equation, $E = 1.090(Q)^{-0.2594}$, where E equals the allowable emission limit for PM in pounds per million Btu and Q equals the maximum heat input in million Btu per hour. The allowable PM emission limit for this boiler is provided in the following table.

Emission Source	Heat Input of the Emission Sources (million Btu/hr)	Maximum Heat Input (million Btu/hr)	Emission limit (lb/million Btu)
Plant 1 and 2 boiler (ID No. CDB1)	12.4	105.1	0.33
Plant 3 boiler (ID No. CDB2)	20.9		
Boiler No. 3 (ID No. ES3)	20.9		
Boiler No. 4 (ID No. ES4)	20.9		
Temporary, back up boiler (ID No. TB1)	30		

The formaldehyde plant tail gas is a clean light gas that produces little, if any, particulate emissions. The emission factor for PM from the combustion of natural gas or propane is 0.007 pounds per million Btu as provided in the DAQ spreadsheet.[8] No monitoring, recordkeeping, and reporting are required to ensure compliance for this rule.

The permit currently lists the equation for 02D .0503 rather than the emission limit. The permit will be modified under this permit renewal/modification to specify the emission limit rather than the equation. Continued compliance is expected.

- 15A NCAC 02D .0516, Sulfur Dioxide from Combustion Sources - Tail gas from the silver catalyst processes is the primary fuel for this boiler, with natural gas, and/or propane used as supplemental fuel or upon process startup. No monitoring, recordkeeping, or reporting is required because of the low sulfur content of these fuels, which are inherently low enough in sulfur that continued compliance is expected. No changes are required under this permit renewal/modification.

[7] The term "temporary" is descriptive only. The boiler does not meet the definition of a temporary boiler under 40 CFR Part 60, Subpart Dc.

[8] Natural gas emission factor is from the DAQ's "Natural Gas Combustion Emission Calculator Revision K" (06/19/2012).

- 15A NCAC 02D .0521, Control of Visible Emissions - Due to the low visible emissions associated with tail gas and natural gas/propane firing, no visible emissions are anticipated. No monitoring, recordkeeping, or reporting is required and continued compliance is expected.

- 15A NCAC 02D .0524, NSPS – The boiler is subject to the NSPS for Small Industrial, Commercial, Institutional Steam Generating Units, 40 CFR Part 60, Subpart Dc. More discussion on NSPS is provided in Section 10.

- 15A NCAC 02D .1111, MACT – The temporary backup boiler will be used as a control device used to control tail gases from the affected Group I process vents (closed vent system, ID No. CVS1). Thus, the boiler is subject to 40 CFR Part 63, Subpart G. Pursuant to 40 CFR 63.114(a)(3), boilers used to control process vent emissions that use the tail gas as a primary fuel are not required to install temperature monitoring equipment in the firebox. In addition, pursuant to 40 CFR 63.116(b)(2), no performance test is required for a boiler used as a control device provided the tail gas is introduced to the firebox as the primary fuel or with the primary fuel (i.e., natural gas).

N. Wax Emulsion Plant (ID No. WAX)

In the wax emulsion process, raw materials including slack wax, water, and acid/bases are combined in a premix tank in a batch fashion. The premix tank feeds a hold tank that meters the wax mixture into a continuously operated homogenizer, which completes the product mixing. After the product is mixed and cooled, it is transferred to storage tanks prior to loading.

The wax plant is subject to 40 CFR Part 63, Subpart FFFF, NESHAP for Miscellaneous Organic Chemical Manufacturing, referred to as MON MACT. As specified under 40 CFR 63.2435(b), the wax production falls under SIC code 2891, processes materials that contain the HAP methanol, and is not subject to any other MACT. Therefore, it meets the applicability of the MON.

- 15A NCAC 02D .1111, MACT –The wax plant (ID No. WAX) is subject to 40 CFR Part 63, Subpart FFFF, or the MON MACT. As shown in a previous permit review[9], maintenance wastewater from the wax plant is subject to the MON. As specified in 40 CFR 63.2485 and Table 7 of the MON MACT, for each maintenance wastewater stream, Hexion must comply with the requirements in 40 CFR 63.105 of Subpart F. These requirements are addressed in Section 2.2.A.3 of the permit and are discussed in more detail in Section 9 below.

  At the beginning of 2011, it was determined that a raw material used in the slack wax could contain toluene as an impurity at a levels of 10 to 200 ppm. With this level of toluene, the vents in the wax plant become Group 2 batch process vents as defined under 40 CFR 63.2550. The only requirements under the MON are recordkeeping and also the semiannual deviation report. These conditions will be added to the permit under renewal/modification.

- 15A NCAC 02Q .0317, Avoidance Conditions –The permit contains avoidance conditions under for 15A NCAC 02D .0530, PSD for VOCs. More discussion on PSD avoidance is provided under Section 12.

[9] Table from review from prior permit renewal by Jenny Kelvington (March 11, 2010).

O. One Diesel-Fired Emergency Generator, 340 hp, (ID No. ES-EG1) and Two Diesel-fired Fire Water Pumps, 150 hp each, (ID No. ES-FP1 and ES-FP2)

Hexion has three engines that serve as emergency engines.

- 15A NCAC 02D .0516, Sulfur Dioxide Emissions – No monitoring, recordkeeping, or reporting is required when firing on diesel fuel. This fuel is inherently low enough in sulfur that continued compliance is expected. No changes are required under this permit renewal/modification.

- 15A NCAC 02D .0521, Control of Visible Emissions – No monitoring, recordkeeping, or reporting is required when firing with diesel fuel. No changes are required under this permit renewal/modification.

- 15A NCAC 02D .1111, MACT – These engines are subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE), 40 CFR Part 63, Subpart ZZZZ. These engines are considered to be existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions. A summary of the requirements under MACT Subpart ZZZZ is provided below.

  - Install a non-resettable hour meter on the engine.
  - Change oil and filter every 500 hours of operation or annually.
  - Inspect all hoses and belts every 500 hours of operation or annually and replace if necessary.
  - Inspect air cleaner every 1,000 hours of operation or annually.
  - Operate no more than 100 hours for maintenance and readiness testing.
  - Follow recordkeeping and reporting requirements.
  - Achieve compliance by May 3, 2013.

  The permit was updated to reflect the most current permitting language for MACT Subpart ZZZZ emission sources.

9. Regulations that Are Applicable to Multiple Emission Sources

Hexion is subject to the following regulations that are either applicable to multiple emission sources or are applicable facility-wide.

A. Regulations that Affect Multiple Emission Sources

The regulations listed below are found in Section 2.2.A of the permit and are applicable to multiple emission sources at the facility.

- Section 2.2.A.1 – General Provisions for NESHAP, 40 CFR Part 63, Subpart A – The emission sources at Hexion that are subject to a MACT standard are also subject to the start-up, shutdown, and malfunction procedures under 40 CFR Part 63, Subpart A. Per 40 CFR 63.6(e)(3), Hexion is required to develop and maintain a Startup, Shutdown, and Malfunction (SSM) Plan to ensure the facility is prepared to correct malfunctions as soon as practicable after their occurrence to minimize excess emissions of HAPs and to reduce the reporting burden associated with periods of startup, shutdown, and malfunction. This plan addresses

monitoring equipment as well as process and control equipment and may be revised by the facility or at the request of the DAQ should it be determined that it does not adequately address all SSM issues relating to the affected equipment. Hexion is required to submit periodic reports semiannually specifying procedures of the plan are consistently followed during an SSM event and to submit immediate reports in the event that the plan is not followed.

The revisions to the MACT Subpart OOO specify that emission limitations apply during periods of SSM and a SSM plan is no longer applicable. Reference to 40 CFR Part 63, Subpart UU, with which the facility is already complying as part of the existing MACT standards for Subpart OOO, were removed from the SSM under 40 CFR Part 63, Subpart A as part of the permit renewal/modification.

- Section 2.2.A.2 – This permit condition covers leak provisions for vapor collection systems and closed-vent systems. Two MACT standards are addressed in this permit condition. The first is the NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, which is applicable to the vapor collection system and closed-vent systems (ID Nos. CVS1 and CVS2). The second standard is the NESHAP for Manufacture of Amino/Phenolic Resins, 40 CFR Subpart OOO. As specified under 40 CFR 63.1403, closed vent systems complying with Subpart OOO must meet the requirements of NESHAP for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process, 40 CFR Part Subpart SS. Thus, the vapor collection systems and closed-vent systems (ID Nos. CVS3 and NRBPV1) that vent emissions from the resin process to associated control devices for compliance with Subpart OOO must meet the requirements in 40 CFR Subpart SS.

  The leak provisions in these two regulations – 40 CFR Subparts G and SS – are so similar that requirements are combined into a single permit condition. Under these rules, Hexion must ensure that the emissions collection system and associated ducting/piping are not allowing emissions to unintentionally bypass the control device. Ducting requires an initial and annual leak inspections using instrumentation. Hard piping requires only initial inspection. Recordkeeping and semiannual reporting is required for all inspections, any leaks detected, and any leak repair (or why a leak was not repaired).

  The permit condition was modified under this permit renewal/modification to ensure that all provisions of each rule are covered. References to each rule were added for completeness as well.

- Section 2.2.A.3 – NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F – Certain emission sources subject to MACT HON (Subpart F, G, or H) and MON (Subpart FFFF) are subject to the maintenance wastewater provisions under 40 CFR 63.105 under MACT Subpart G. Maintenance wastewater means wastewater generated by the draining of process fluid from components in the chemical manufacturing process unit into an individual drain system prior to or during maintenance activities. Maintenance wastewater can be generated during planned and unplanned shutdowns and during periods not associated with a shutdown. Examples of activities that can generate maintenance wastewaters include, but are not limited to, descaling of heat exchanger tubing bundles, cleaning of distillation column traps, draining of low legs and high point bleeds, draining of pumps into an individual drain system, and draining of portions of the chemical manufacturing process unit for repair. This is a general requirement requiring the facility to develop a plan to handle maintenance wastewater. The plan is an additional part of the SSM plan and follows the recordkeeping and reporting requirements of the SSM plan.

B. Facility Wide Conditions

The regulations listed below are found in Section 2.2.B of the permit and are applicable facility-wide.

- 15A NCAC 02D .0958, Work Practices for Sources of VOCs – No changes are required under this permit renewal/modification.

- 15A NCAC 02D .1100, Control of Toxic Air Pollutants – The permit contains modeled emission rates for ammonia, formaldehyde, and phenol. This condition is state-enforceable only. See Section 14 for further discussion regarding air toxics.

- 15A NCAC 02D .1806, Control and Prohibition of Odorous Emissions - This condition is facility-wide and is state enforceable only.

- 15A NCAC 02Q .0317, Avoidance Condition – The facility has accepted permit limits on VOC and SO2 to avoid applicability to 15A NCAC 02D .0530, Prevention of Significant Deterioration. See Section 12 for further discussion on PSD.

- 15A NCAC 02Q .0711, Emission Rates Requiring a Permit – The facility is subject to 2Q .0711 because of emissions of toluene from the storage tank (ID No. 4201), as discussed in Section 7 above. Facility-wide emissions of toluene are below the TPER. This condition is facility-wide and is state enforceable only.

10. NSPS

Hexion is subject to the New Source Performance Standards as discussed below.

NSPS Subpart Dc

The temporary, back up boiler (ID No. TB1) has yet to be placed on site. When it is brought on site, boiler TBI will be subject to NSPS for Small Industrial, Commercial, Institutional Steam Generating Units, 40 CFR Part 60, Subpart Dc. This subpart applies to boilers that are constructed, modified, or reconstructed after June 9, 1989 and have a maximum design heat input capacity > 10 million Btu per hour and < 100 million Btu per hour. The requirements for boilers subject to NSPS Subpart Dc vary based on the size of the boiler and fuel type fired. The permit limits the size of the boiler to no more than 30 million Btu per hour. It will fire on natural gas and tail gas from the silver catalysis process. With these restrictions, the boiler will not be subject to the PM or SO2 standards in NSPS Subpart Dc. Hexion must record monthly fuel usage for the boiler. Additionally, the facility must submit written notification of the actual date of initial startup of the backup boiler. There are no other requirements under NSPS Dc when firing natural gas.

Although boiler TB1 is referred to as a temporary boiler, it is not considered a temporary under NSPS Subpart Dc, because its primary fuel, tail gas from the silver plants, does not meet the definition of natural gas as defined under the subpart.

NSPS Subpart Kb

Storage vessels with a capacity greater than 75 cubic meters (19,810.5 gallons), constructed, reconstructed or modified after July 23, 1984, and storing volatile organic liquids are subject to

40 CFR Part 60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984. Methanol storage tanks (ID Nos. METH1 and METH2) meet these requirements and are subject to this rule. These tanks are also Group 1 storage vessels under 40 CFR Part 63, Subpart G. As specified in 40 CFR 63.110(b)(1), a Group 1 storage vessel that is also subject to 40 CFR Part 60, Subpart Kb is required to comply only with the provisions in 40 CFR Part 63, Subpart G. Hexion complies with these rules by installing and maintaining fixed external roofs and floating internal roofs on the methanol storage tanks.

NSPS Subpart VV

The group of equipment within the metal oxide formaldehyde process (ID No. ES16) is subject to the Standards of Performance for Equipment Leaks of VOC in the SOCMI for Which Construction, Reconstruction, or Modification Commenced After January 5, 1981, and on or before November 7, 2006, 40 CFR Part 60, Subpart VV. Certain process equipment in ES16 is subject to the leak detection and repair requirements under 40 CFR Part 63, Subpart H. As allowed under 40 CFR 63.160(c)(1), compliance with the requirements under 40 CFR Part 63, Subpart H constitutes compliance with 40 CFR Part 60, Subpart VV. For the purposes of applicability and compliance with NSPS Subpart VV, Hexion considers all VOC in such equipment as if it were organic HAP. There are no other requirements under NSPS Subpart VV.

NSPS Subpart III

The metal oxide formaldehyde process (ID No. ES16) is subject to the Standards of Performance for VOC Emissions from the SOCMI Air Oxidation Unit Processes Oxidation Reactors. This process is also considered a Group 1 process vent under 40 CFR Part 63, Subpart G. As specified in 40 CFR 63.110(d)(1) under Subpart G, Group 1 process vents that are also subject to 40 CFR Part 60, Subpart III are required to comply only with the provisions in 40 CFR Part 63, Subpart G. There are no other requirements under NSPS Subpart III.

11. NESHAPS/MACT

Hexion is subject to the MACTs as listed below. More detail on each of these MACTs is provided in either Section 8 on a source-by-source basis or in Section 9 for MACTs affecting multiple emission sources.

- General Provisions for NESHAP, 40 CFR Part 63, Subpart A – These sources listed below are subject to the start-up, shutdown, and malfunction procedures under 40 CFR Part 63, Subpart A.
  - Silver Catalyst Formaldehyde processes (ID Nos. FORM12 and FORM3)
  - Metal Oxide Catalyst Formaldehyde Process (ID No. ES16)
  - Closed Vent Systems (ID Nos. CVS1 and CVS2)
  - The aggregate batch stream (ID No. CV3)
  - The non-reactor process vent stream (ID No. NRBPV1)
  - Railcar methaform and formaldehyde product load outs (ID Nos. RLOAD1 and RLOAD2)
  - Tank truck formaldehyde and methaform loadout (ID No. TLOAD1A)
  - Wax Plant (ID No. WAX)
  - Three reactors (ID Nos. BR2, BR3, and BR4)
  - Three distillate receiving tanks (ID Nos. BR2DRT, BR3DRT, and BR4DRT)
  - Weigh tank (ID No. FWTBR2)
  - RTU mix tank with filter (ID No. ES103)
  - Aggregate Batch Vent Stream (ID No. CVS3)

- RTU mix tank with filter (ID No. ES103)
- Non-Reactor Batch Process Vent Stream (NRBPV1)

- NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F, Heat Exchanger Requirements
  - Heat Exchangers (ID Nos. HX9A, HX9B, HXT5, HXE16, HXT1, HXT2, HX2, HX6, HX7C, HX8, HX7, HX8A, HX8B, HX10, HX11, and HX5)

- NESOHAP from the SOCMI, 40 CFR Part 63, Subpart F, Maintenance Wastewater Requirements under 40 CFR 63.105.
  - Silver Catalyst Formaldehyde processes (ID Nos. FORM12 and FORM3)
  - Metal Oxide Catalyst Formaldehyde Process (ID No. ES16)
  - Closed Vent Systems (ID Nos. CVS1 and CVS2)
  - Heat Exchangers (ID Nos. HX9A, HX9B, HXT5, HXE16, HXT1, HXT2, HX2, HX6, HX7C, HX8, HX7, HX8A, HX8B, HX10, HX11, and HX5)
  - Pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or closed vent systems (required by MACT H) in HAP service (ID Nos. FORMEQLK, ES16, and HEXAEQLK)
  - Railcar methaform and formaldehyde product load outs (ID Nos. RLOAD1 and RLOAD2)
  - Tank truck formaldehyde and methaform loadout (ID No. TLOAD1A)
  - Methanol storage tanks (ID Nos. METH1 and METH2)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 1 Process Vents.
  - Silver Catalyst Formaldehyde processes (ID Nos. FORM12 and FORM3)
  - Plant 1 and 2 boiler (ID No. CDB1) and the Plant 3 boiler (ID No. CDB2) used as controls for the silver processes
  - Metal Oxide Catalyst Formaldehyde Process (ID No. ES16)
  - Closed Vent Systems (ID Nos. CVS1 and CVS2)
  - Back up boiler (ID No. TB1) (as control device for FORM12 and FORM3)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 1 Storage Vessels
  - Methanol storage tanks (ID Nos. METH1 and METH2)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 1 Transfer Operations.
  - Railcar methaform and formaldehyde product load outs (ID Nos. RLOAD1 and RLOAD2)
  - Tank truck formaldehyde and methaform loadout (ID No. TLOAD1A)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 2 Process Vents
  - Hexamine Reactor (ID No. HRE)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 2 Storage Vessels
  - Storage tanks (ID Nos. STORE1MAF1, STORE1MAF2, STOREFORM1 through STORE1FORM9, MOSTORE2, FORMSTG1 through FORMSTG7, MOSTORE1A through MOSTORE1C, MOSTORE1D through MOSTORE1E, CFRT3, ESOT1, ESOT2, ESOT3, ESCT1, ESCT2, ESLH1, and ESDS)

- Distillation column raw product feed tanks for formaldehyde processes (ID Nos. CFR12 and CFR3)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 2 Transfer Operations
  - Railcar urea formaldehyde concentrate product load out (ID No. RLOAD3)
  - Railcar liquid hexamine load out and receiving (ID No. RLOAD4)
  - Tank truck urea formaldehyde concentrate product load out (ID No. TLOAD2A)
  - Tank truck liquid hexamine load out (ID No. TLOAD3A)

- NESOHAP from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, 40 CFR Part 63, Subpart G, Group 2 Wastewater Stream
  - Hexamine Reactor (ID No. HRE)
  - The formaldehyde plant No. 3 De-acidifier

- NESOHAP for Equipment Leaks, 40 CFR Part 63, Subpart H
  - Pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or closed vent systems (required by MACT H) in HAP service (ID Nos. FORMEQLK, ES16, and HEXAEQLK)

- NESHAP for Manufacture of Amino/Phenolic Resins 40 CFR Part 63, Subpart OOO
  - Three reactors (ID Nos. BR2, BR3, and BR4)
  - Three distillate receiving tanks (ID Nos. BR2DRT, BR3DRT, and BR4DRT)
  - Weigh tank (ID No. FWTBR2)
  - RTU mix tank with filter (ID No. ES103)
  - Aggregate Batch Vent Stream (ID No. CVS3)
  - RTU mix tank with filter (ID No. ES103)
  - Non-Reactor Batch Process Vent Stream (NRBPV1)

- NESHAP for Manufacture of Amino/Phenolic Resins Subpart OOO /40 CFR Part 63, Subpart UU
  - Pumps, agitators, pressure relief devices, open-ended valves or lines, valves, connectors, instrumentation systems, compressors, and sampling connection systems is organic HAP service (ID No. BREQLK)

- NESHAP for Manufacture of Amino/Phenolic Resins Subpart OOO /40 CFR Part 63, Subpart SS
  - Aggregate Batch Vent Stream (ID No. CVS3)
  - Non-Reactor Batch Process Vent Stream (NRBPV1)

- NESHAP for Organic Liquids Distribution (Non-Gasoline), 40 CFR Part 63 Subpart EEEE
  - Formaldehyde/UFC product drum and tote loading (ID No. IFORMDT)
  - Phenol unloading – track 4 (ID No. IRPT)
  - Methanol unloading – track 6 (ID No. IRMT6)
  - Unload methanol trucks (ID No. ITUNL-MT)
  - Unload methanol distillate (ID No. ITUNL-MD)
  - Unload formaldehyde, methaform, and UFC trucks/railcars (ID No. ITUNL-FMU)

- NESHAP for Miscellaneous Organic Chemical Manufacturing, 40 CFR Part 63, Subpart FFFF
  - Wax Plant (ID No. WAX)

- NESHAP for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63, Subpart ZZZZ
  - One Diesel-Fired Emergency Generator (ID No. ES-EG1)
  - Two Diesel-fired Fire Water Pumps (ID No. ES-FP1 and ES-FP2)

- 15A NCAC 02D .1109, Case-by-Case MACT
  - Natural gas/ No. 4 fuel oil/ No. 5. fuel oil/ No. 6 fuel oil-fired boilers (ID Nos. ES3 and ES4)

12. PSD

Chemical processing plants, such as Hexion, are one of the 28 listed source categories that are considered major sources under PSD if they have the potential to emit 100 tons per 12-month period or more of any criteria pollutant. The facility has accepted two avoidance conditions to remain minor for PSD.

VOC

Hexion has accepted a PSD avoidance condition limiting facility wide VOC emissions to no more than 100 tons per consecutive 12-month period, rolling total calculated monthly. The avoidance condition allows the facility to either limit actual VOC emissions from the resin reactors and formaldehyde plants to 49 tons per year and assume potential emissions from all other sources are 51 tons per year or calculate actual emissions from some or all of the other sources. Calculations of VOC emissions from the facility are performed on a monthly basis and reported semiannually. As shown in the header to this review, the emissions of VOC are far below the PSD avoidance limit.

SO2

Hexion has accepted a PSD avoidance condition limiting facility wide SO2 emissions to no more than 100 tons per consecutive 12-month period, rolling total calculated monthly. Although this is a facility wide limit, natural gas/ No. 4 fuel oil/ No. 5. fuel oil/ No. 6 fuel oil-fired boilers (ID Nos. ES3 and ES4) are the primary contributors of SO2, with potential unrestricted SO_2 emissions at ~ 400 tons per year, as reported in the permit application. Potential SO_2 emissions from all other sources are ~0.35 tons per year. To ensure the limit is not exceeded, Hexion monitors the amount of residual fuel fired in these two boilers and the respective sulfur content, maintains records, and reports the total calculated sulfur dioxide emissions semiannually. As shown in the header to this review, the emissions of SO2 are far below the PSD avoidance limit.

The facility has requested in the permit application to move the PSD avoidance condition for SO2 from Section 2.1.L, which is specific to the boilers, to Section 2.2.B, which is applicable facility-wide. As noted above, the boilers ES3 and ES4 account for the vast majority of the sulfur dioxide emissions (i.e., greater than 99%). It is only necessary to track emissions of SO2 from these boilers to assure compliance with the PSD avoidance limit for SO2. The avoidance condition will remain under the boiler specific section for this reason.

13. 112(r) and CAM

112(r)
The facility is subject to Section 112(r) of the Clean Air Act requirements because it stores formaldehyde and ammonia in quantities above the thresholds in the Rule. The following processes at Hexion are subject to 112(r):

1. Formaldehyde Plants (formaldehyde, EPA Program 3)
2. Urea-Formaldehyde Resin Manufacturing (formaldehyde, EPA Program 3)
3. Phenol-Formaldehyde Resin Manufacturing (formaldehyde, EPA Program 3)
4. Hexamine Plant[10] (ammonia, EPA Program 3)

Hexion submitted an updated Risk Management Plan (RMP) to the EPA on June 14, 2014. In accordance with 40 CFR 68.150, their next submittal of the RMP is due by June 13, 2019, or as specified in 40 CFR 68.10.

The permit renewal/modification does not affect the 112(r) status of Hexion. However, the permit will be updated under the permit renewal/modification to include the most updated permit language for 112(r).

CAM
40 CFR Part 64 is applicable to any pollutant-specific emission unit, if the following three conditions are met:

- the unit is subject to any (non-exempt: e.g. pre November 15, 1990, Section 111 or Section 112 standard) emission limitation or standard for the applicable regulated pollutant.
- the unit uses any control device to achieve compliance with any such emission limitation or standard.
- the unit's precontrol potential emission rate exceeds either 100 tons per year (for criteria pollutants) or 10/25 tons per year (for HAPs).

As indicated in the review for the previous permit renewal,[11] each emission source with controls has been evaluated to assess CAM applicability. Hexion is exempt from CAM because the only source with potential emissions greater than 100 tons per year is the MO formaldehyde plant (ID No. ES-16) and this process is subject to a MACT proposed after November 15, 1990 (i.e., MACT Subpart G).

14. Facility Wide Air Toxics

The permit contains modeled limits for compliance with NC Air Toxics for ammonia, formaldehyde, and phenol from various sources throughout the facility. The majority of the limits were established as part of the Special Order by Consent (SOC: 2005-003) with Hexion, which is a former owner of the facility. At the time, the facility was in noncompliance with MACT HON and MACT OOO. Under the SOC, the facility had to install and test a scrubber for compliance with MACT Subpart OOO and test the catalytic oxidizer on the MO for compliance with the HON. The facility also had to submit facility wide compliance demonstration for compliance with 02D .1100.

The facility made several modifications under Air Permit No. 03387T35, which resulted in a net facility-wide increase of formaldehyde and phenol. In accordance with 15A NCAC 02Q .0706, the

[10] No formaldehyde is stored at the Hexamine Plant and therefore, 112(r) is only applicable for ammonia at this source.
[11] Jenny Kelvington (March 11, 2010).

facility performed and submitted modeling at that time demonstrating that these two TAPs did not exceed the acceptable ambient levels (AALs) listed in 15A NCAC 02D .1104. Tom Anderson, AQAB, reviewed the modeling and found that it adequately demonstrated compliance, on a source-by-source basis, for both toxics. Maximum impacts for a one-hour averaging period were 96% of AAL for formaldehyde and 55% of AAL for phenol. The permit limits for formaldehyde and/or phenol were revised for resin Scrubber Stack (ID No. CD200A/B), Formaldehyde Plant No. 4 (ID No. ES16), and resin RTU mix tank with filter (ID No. ES103) under Air Permit No. 03387T35.

The current air permit references 15A NCAC 02Q .0705, Existing Sources and SIC Calls. This rule was repealed on May 1, 2014, and all references to 02Q .0705 will be removed from the permit under this modification. The limits will remain in the permit because they were added under the SOC and under 02Q .0706 as noted previously.

As noted above under Section 7, slack wax containing a trace amount toluene will be stored in the relocated storage tank (ID No. 4201). Emissions of toluene were shown to be below the TPER. A permit condition addressing compliance with NC Air Toxics under 02Q .0711 will be added to the permit for the triglyceride/oils of mixed fatty acids, slack wax or emulsified wax storage tank (ID No. 4201).

15. Facility Emissions Review

Actual emissions for criteria pollutants and HAPs are provided in the header of this permit review. The potential emissions of CO2e were reported as ~ 69,000 metric tons in the permit application.

16. Compliance Status

During the most recent compliance inspection, conducted on January 7, 2016 by Mr. Greg Reeves of the FRO, the facility appeared to be in compliance with all applicable requirements. Additionally, a signed Title V Compliance Certification (Form E5) indicating that the facility was in compliance with all applicable requirements was included with the permit renewal application.

Hexion has had the following compliance issues within the past five years:

- A Notice of Deviation (NOD) was issued on August 9, 2013 for failure to comply with the leak detection and repair requirements under 40 CFR Part 63, Subpart H.
- A Notice of Violation (NOV) was issued on August 17, 2010 for a deviation of the facility's Startup, Shutdown, and Malfunction Plan on December 30, 2009.
- A NOV was issued on February 15, 2010 for operating liquid to gas ratio for the wet scrubber (ID No. CD-104S) out of permit range.

All NODs and NOVs have been resolved.

17. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit pursuant shall be provided to EPA. Also pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall

be provided to each affected State at or before the time notice provided to the public under 02Q .0521 above. The state of South Carolina is within 50 miles of the facility and will be notified accordingly.

18. Other Regulatory Considerations

- A P.E. seal was required for the minor modification and was included in permit application No. 2600009.14B
- A zoning consistency determination is NOT required for any of these permit applications.
- A Permit fee was required for the minor modifications and was included in permit application Nos. 2600009.14B and 2600009.15A.

19. Recommendations

The permit renewal/modification applications for Hexion Inc. - Fayetteville Facility Fayetteville, Cumberland County, NC have been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 03387T44.

Attachment 1
Table of Changes

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
Cover and throughout	--	Cover and throughout	--	Updated all dates and permit revision numbers.
--	Insignificant Activities List	--	Insignificant Activities List	• Added reactor 2, two blow pots (approximately 100 gallons each) (ID Nos. IB2-1 and IB2-2). • Added reactor 3, two blow pots (approximately 100 gallons each) (ID Nos. IB3-1 and IB3-2). • Added fire water storage tank (ID No. I-FWT). • Added lime storage tank (ID No. I-LST). • Added T-300 scrubber tank (ID No. I-T300). • Added a glycerin truck unloading (ID No. ITUNLY-GLY). • Added sodium lignosulfonate unloading (ID No. SLS) • Added deionized water tank (ID No. I-DWT). • Added MACT Subpart EEEE label to applicable storage tanks.
--	Table of Contents	--	Table of Contents	Added Section 2.3, Other Applicable Requirements, for 112(r).

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
3 – 8	Section 1.0 – Equipment List	3 – 9	Section 1.0 – Equipment List	• Modified silver formaldehyde process description (ID Nos. FORM12 and FORM3) to simplify description and specify that Plant 1 and 2 boiler (ID No. CDB1) and Plant 3 boiler (ID No. CDB2) serve as control devices. • Revised description of how emissions are returned to formaldehyde processes (ID Nos. FORM12, FORM3, or ES16) for product recovery. • Added labels on distillation column raw product feed tanks (ID Nos. CFR12 and CFR3) indicating that they are subject to 40 CFR Part 63, Subpart G, as Group 2 storage vessels. • Added capacity to descriptions of the distillation columns (ID Nos. CFR12 and CFR3). • Added methanol reflux tank and product sump to equipment under the silver catalyst formaldehyde process (ID No. FORM3). • Added heat exchanger (ID No. HX12). • Changed description of catalytic fume incinerator (ID No. CD17) to catalytic oxidizer. • Clarified that emission sources FORMEQLK and HEXAEQLK equipment have no add-on control devices. • Grouped together emission sources in resin production process being controlled by packed bed scrubbers CD200A and CD200B. • Modified control options allowing load out operations (ID Nos. RLOAD3 and TLOAD2A) to vent to the atmosphere. • Modified description of storage tanks (ID Nos. MOSTORE 1A through MOSTORE 1A and MOSTORE 2) to specify that the store 50% wt formaldehyde, UFC, and hydrolyzed re-work resin. • Removed liquid hexamine storage tank (ID No. ESLH2). • Added label indicating that boilers (ID Nos. ES3 and ES4) are subject to MACT DDDDD. • Removed footnotes discussing minor modifications. • Added footnotes specifying compliance dates for MACT Subpart DDDDD.
9	2.1.A – Regulations Table	10	2.1.A – Regulations Table	• Removed equation under 02D .0503 and replaced with numerical PM emission limit. • Reordered table so that regulations follow numerical order.

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
10	2.1.A.2	10	2.1.A.1	• Moved regulation 15A NCAC 02D .0503 to Section 2.1.A.1. • Removed equation under 15A NCAC 02D .0503 and replaced with numerical PM emission limit. • Revised testing language to reflect most current permit language.
10	2.1.A.3	11	2.1.A.2	Moved regulation 15A NCAC 02D .0516 to 2.1.A.2.
10	2.1.A.4	11	2.1.A.3	Moved regulation 15A NCAC 02D .0521 to 2.1.A.3.
10	2.1.A.1	11	2.1.A.4	Moved regulation 15A NCAC 02D .1111 to 2.1.A.4.
10	2.1.B – Regulations Table	12	2.1.B – Regulations Table	• Removed the term "superseded" from the table. This term is not correctly used in this situation. • Reordered table so that regulations follow numerical order.
--	--	12	2.1.B.1	Added condition specifying that the Permittee is subject to 40 CFR Part 60, Subpart VV and complies with this rule by complying with 40 CFR Part 63, Subpart H.
--	--	13	2.1.B.2	Added condition specifying that the Permittee is subject to 40 CFR Part 60, Subpart III and complies with this rule by complying with 40 CFR Part 63, Subpart G for Group 1 process vents.
12 – 14	2.1.B.1	13	2.1.B.3	Added noncompliance statements throughout condition.
--	--	13, 15	2.1.B.3.e and 2.1.B.3.cc	Added testing requirements for new catalytic oxidizer (ID No. CD17).
14	2.1.C	15	2.1.C	Added heat exchanger (ID No. HX12).
14 – 16	2.1.C.1	16 – 17	2.1.C.1	Added noncompliance statements throughout condition.
17 – 29	2.1.D	17 – 30	2.1.D	• Changed the title of this section to "Process Equipment Subject to 40 CFR Part 63, Subpart H (LDAR)." • Clarified the equipment in the equipment list. • Added noncompliance statements throughout the section. • Added references.
30 – 31	2.1.E	30	2.1.E	Changed the title of this section to "Urea Storage, Handling, and Conveying."
	2.1.E Regulations Table and 2.1.E.1.a	30 – 31	2.1.E Regulations Table and 2.1.E.1.a	Added equation for allowable PM emission limit under 02D .0515 for process rates above 30 tons per hour.
30	2.1.E.1.c	31	2.1.E.1.c	Updated the permit condition for monitoring under 15A NCAC 02D .0515 to reflect the most current permit language.
31	2.1.E.2.c	32	2.1.E.2.c	Updated the permit condition for monitoring under 15A NCAC 02D .0521 to reflect the most current permit language.

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
32 – 33	2.1.F	32 – 33	2.1.F	• Changed the title of this section to "Equipment Subject to 40 CFR Part 63, Subpart G, Group 2 Process Vents, Storage Vessels, Transfer Operations, and Wastewater Operations" • Revised permit to include all emission sources Group 2 equipment as defined under 40 CFR Part 63, Subpart G under this permit condition. As a result, Group 2 Storage Tanks and Group 2 Transfer operations, which were previously listed under Section 2.1.K, are now included in 2.1.F. • Added distillation column raw product feed tanks (ID Nos. CFR12 and CFR3), which are subject to 40 CFR Part 63, Subpart G, as Group 2 storage vessels. • Modified description of storage tanks (ID Nos. MOSTORE 1A through MOSTORE 1A and MOSTORE 2) to specify that they store 50% wt formaldehyde, UFC, and hydrolyzed re-work resin. • Added the option for the load operations (ID Nos. RLOAD3 and TLOAD2A) to vent to the atmosphere. • Removed superscripts on emission sources.
32	2.1.F – Regulations Table	33	2.1.F – Regulations Table	• Revised permit to include all Group 2 equipment under 40 CFR Part 63, Subpart G under this permit condition. • Removed superscripts and specified more clearly which emission sources are subject to each regulation.
32	2.1.F.1.f	34	2.1.F.1.f	Moved condition requiring records pursuant to Section 2.2. "Multiple Emission Sources" requirements from reporting section to recordkeeping section.
33	2.1.F.1.g	34	2.1.F.1.g	Added noncompliance statement.
--	2.1.F.1.i	34	2.1.F.1.i	Added condition requiring submittal of applicable reports pursuant to Section 2.2 "Multiple Emission Sources" requirements.
--	--	34	2.1.F.2	• Moved condition for Group 2 storage vessels from Section 2.1.K.1 to 2.1.F.2. • Added noncompliance statement.
--	--	35	2.1.F.3	• Moved condition for Group 2 transfer racks from Section 2.1.K.2 to 2.1.F.3. • Added noncompliance statement.
33	2.1.F.2	35	2.1.F.4	• Moved condition for Group 2 wastewater from Section 2.1.F.2 to Section 2.1.F.4. • Added noncompliance statement.

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
34	2.1.G – Equipment List	35 – 36	2.1.G – Equipment List	• Revised permit to include all emission sources in the Resin Production under this permit condition. As a result, tanks in the Resin Production Process that were previously listed under Section 2.1.K are now included in Section 2.1.G. • Removed superscripts on emission sources.
34	2.1.G – Regulations Table	36	2.1.G – Regulations Table	• Removed superscripts and specified more clearly which emission sources are subject to each regulation. • Removed requirement specifying that CVS3 and NRBPV1 are subject to the startup, shutdown, and malfunction procedures under 40 CFR 63, Subpart A.
34	2.1.G.1.a	37	2.1.G.1.a	Removed superscripts and listed equipment subject to 15A NCAC 02D .0515.
35	2.1.G.1.c	37	2.1.G.1.c	Added requirement specifying that no monitoring or recordkeeping of RTU mix tank (ID No. ES103) with associated particle separator (ID No. CD-104PS) and a wet scrubber (ID No. CD-104S) is required for compliance with NCAC 02D .0515.
35	2.1.G.1.d	37	2.1.G.1.d	Updated monitoring and recordkeeping requirements under NCAC 02D .0515 with most current permitting language.
35	2.1.G.2.c	37	2.1.G.2.c	Updated monitoring requirements under NCAC 02D .0521 with most current permitting language.
--	--	38	2.1.G.3.c	Added emission limits for pressure relief devices.
36	2.1.G.3.c	38	2.1.G.3.d	Removed statement specifying that the emission limits do not apply during SSM.
36	2.1.G.3.d	38	2.1.G.3.e	Revised language relating to shut down of a control device.
36	2.1.G.3.e	38	2.1.G.3.f	Removed language regarding SSM and added general duty language.
36	2.1.G.3.h	--	--	Removed statement referencing a deviation of the SSM plan.
37	2.1.G.3.l	39	2.1.G.3.l	Added noncompliance statement.
37	2.1.G.3.m	39	2.1.G.3.m	Added noncompliance statement.
37	2.1.G.3.n	39	2.1.G.3.n	Removed references to SSM.
--	---	39 – 40	2.1.G.3.o. and p	Added requirements for pressure relief devices subject to MACT Subpart OOO.
38	2.1.G.3.p.iii	40	2.1.G.3.r.iii	Removed references to SSM.
38	2.1.G.3.t	41	2.1.G.3.v	Removed references to SSM.
--	--	41	2.1.G.3.w	Added noncompliance statement.
--	2.1.G.3.v	41	2.1.G.3.y	Clarified requirement specifying exemptions to reporting requirements.
38	2.1.G.w	--	--	Removed requirement for submitting reports in accordance with Part 3, General Conditions. This requirement is redundant.

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
38 – 39	2.1.3.G.x	41	2.1.3.G.z	Removed references to the term "exceedance." Exceedance as defined in this permit condition is not included in 40 CFR Part 63, Subpart OOO.
39	2.1.3.G.y	--	--	Removed requirements to submit a semiannual SSM report.
--	--	41 – 42	2.1.G.3.aa	Added requirements for periodic reporting.
--	--	42	2.1.G.bb	Added reporting requirements for pressure relief devices.
--	--	42	2.1.G.cc	Added reporting requirements for electronic reporting of source tests.
40 – 49	2.1.H	42	2.1.H	• Changed the title of this section to "Process Equipment Subject to Equipment Leak Provisions under 40 CFR Part 63, Subpart OOO/UU." • Clarified the equipment included under this permit condition. • Added noncompliance statements throughout section. • Added references throughout section.
40	2.1.H.1	43	2.1.H.1.a and b.	• Revised condition to correspond to revised language under 40 CFR 63.1410. • Added condition specifying that emission limits apply at all time under 40 CFR 63 Subpart UU, except during periods of nonoperation.
42	2.1.H.4.e.iv (A)	46	2.1.H.4.e.iv (A)	Removed references to SSM.
48	2.1.H.12.a.i	51	2.1.H.12.a.i	Removed references to SSM.
50 – 52	2.1.I	53 – 55	2.1.I	• Changed the title of this section to "Equipment Subject to 40 CFR Part 63, Subpart G, Group 1 Transfer Operations." • Added noncompliance statements throughout section. • Added references section.
51	2.1.I.1.k-	54	2.1.I.1.k – 2.1.I.1.n	Revised requirements for monitoring for vapor collection systems that contain by-pass lines. Permit 03387T42 indicated that the Permittee had to comply with provisions under Section 2.2.A.2. for by-pass lines. However, that permit condition did not address by-pass lines.
51	2.1.I.1.m	55	2.1.I.1.q	Revised requirements for recordkeeping for vapor collection systems that contain by-pass lines. Permit 03387T42 indicated that the Permittee had to comply with provisions under Section 2.2.A.2 for recordkeeping. However, that permit condition did not address by-pass lines.
52 – 54	2.1.J	55	2.1.J	Changed the title of this section to "Equipment Subject to 40 CFR Part 63, Subpart G, Group 1 Storage Vessels."

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
--	--	56	2.1.J.1	Added condition specifying that the Permittee is subject to 40 CFR Part 60, Subpart Kb and complies with this rule by complying with 40 CFR Part 63, Subpart G for Group 1 storage vessels.
52 – 54	2.1.J.1	56 – 58	2.1.J.2	• Added noncompliance statements throughout. • Added references.
55 – 56	2.1.K	58	2.1.K	• Changed the title of this section to "Other Emission Sources. • Moved equipment subject to 40 CFR Part 63, Subpart Group 2 Storage Vessels and Group 2 Transfer Rack Operations requirements to Section 2.1.F. • Moved equipment associated with Resin Production to 2.1.G.
56	2.1.K.1	--	--	• Moved condition for Group 2 storage vessels from Section 2.1.K.1 to 2.1.F.2.
56	2.1.K.2	--	--	• Moved condition for Group 2 transfer racks from Section 2.1.K.2 to 2.1.F.3.
57 – 61	2.1.L	59	2.1.L	Added No. 2 fuel oil firing in the boilers throughout the section.
57	2.1.L – Regulations Table	59 – 66	2.1.L – Regulations Table	• Removed equation under 02D .0503 and replaced with numerical PM emission limit. • Added reference to MACT Subpart DDDDD.
57	2.1.L.1	59	2.1.L.1	• Removed equation under 15A NCAC 02D .0503 and replaced with numerical PM emission limit. • Revised testing language to reflect most current permit language.
59	2.1.L.4.	61	2.1.L.4.	Added noncompliance statements throughout.
59	2.1.L.5.b	62	2.1.L.5.b	Corrected dates to indicate that the boilers will be subject to the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR Part 63, Subpart DDDDD beginning May 20, 2019.
--	--	63 – 66	2.1.L.6	Added MACT DDDDD requirements.
62	2.1.M – Regulations Table	67	2.1.M – Regulations Table	• Removed equation under 02D .0503 and replaced with numerical PM emission limit. • Removed extraneous statements specifying that the temporary back-up boiler (ID No. TPB1) is subject to 40 CFR Part 60, Subpart Dc and 40 CFR Part 63, Subpart G.
62	2.1.M.1 a and b	67	2.1.M.1 a and b	• Removed equation under 02D .0503 and replaced with numerical PM emission limit. • Revised testing language to reflect most current permit language.
63 – 64	2.1.M.4	68	2.1.M.4	Revised permit language under 40 CFR Part 60, Subpart Dc.

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
--	2.1.N – Regulations Table	68 – 69	2.1.N – Regulations Table	• Added requirement for PSD avoidance to the regulations table. With the use of slack wax with trace amounts of toluene, the Permittee must account for VOC emissions from the wax plant (ID No. WAX).
--	--	69 – 70	2.1.N.1	Added requirements under MACT Subpart FFFF for the wax plant (ID No. WAX).
--	2.1.O.3	71 – 73	2.1.O.3	Revised permit condition for NESHAP for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63, Subpart ZZZZ to most current permitting language.
67	2.2A. Regulations Table	74	2.2A. Regulations Table	Specified that startup, shutdown, and malfunction requirements are not applicable to MACT Subpart OOO/UU/SS affected sources.
69 – 71	2.2.A.2	76 – 79	2.2.A.2	• Specified equipment that is subject to regulations 40 CFR Part 63, Subpart G, National Emission Standards for Organic HAP (NESOHAP) from the SOCMI for Process Vents, Storage Vessels, Transfer Operations, and Wastewater, and 40 CFR Part 63, Subpart SS, NESHAP for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process. • Added noncompliance statements throughout section. • Added references throughout section.
69	2.2.A.2.b. and c	76	2.2.A.2.b. and c	Clarified that these requirements are only applicable to closed vent systems subject to 40 CFR Part 63, Subpart OOO/SS (ID Nos. CVS1, CVS2, CVS3, and NRBV1).
69	2.2A.2.d.ii.(F)	76	2.2A.2.d.ii.(F) and (G)	Added inspection and recordkeeping requirements subject to closed vent systems subject to 40 CFR Part 63, Subpart G (ID Nos. CVS1 and CVS2) only.
--	--	76 – 79	2.2A.2.d. ii.(H) through (J)	Clarified that these requirements are only applicable to closed vent systems subject to 40 CFR Part 63, Subpart OOO/SS (ID Nos. CVS3 and NRBV1).
70 – 71	2.2A.2.e.vii. and viii	77	2.2A.2.e.vii. and viii	Added inspection and recordkeeping requirements subject to closed vent systems subject to 40 CFR Part 63, Subpart G (ID Nos. CVS1 and CVS2) only.
71	2.2A.2.g. vi.	78	2.2A.2.g. vi. through viii	• Added noncompliance statements throughout. • Added references.
71	2.2.A.3	79	2.2A.3	• Added noncompliance statements throughout. • Added references.
72	2.2.B – Regulations Table	79	2.2.B – Regulations Table	• Removed reference to 02Q .0705, Existing Sources and SIC Calls. This rule was repealed on May 1, 2014. • Added reference to 15A NCAC 02Q .0711.
72	2.2.B.1.b and c	79 – 80	2.2.B.1.b and c	Added noncompliance statements.

Previous Permit		New Permit		Description of Changes
Pages	**Sections**	**Pages**	**Sections**	
74	2.2.B.4	81 – 82	2.2.B.4	• Removed reference to 02Q .0705, Existing Sources and SIC Calls. This rule was repealed on May 1, 2014. • Updated emission source descriptions.
--	--	82 – 83	2.2.B.5	Added requirements for compliance with 15A NCAC 02Q .0711 for toluene.
75	2.2.B.5	83	2.3.A	• Moved requirements for 15A NCAC 02Q .0508(h), Prevention of Accidental Releases, to new section to be consistent with DAQ formatting. • Updated permit condition for 15A NCAC 02Q .0508(h), Prevention of Accidental Releases, with most current permit language.
76 – 87	3.0	84 – 93	3.0	Updated the General Conditions and the List of Acronyms to the most current version (V4.0: 12/17/2015).

Attachment 2
Changes to the TVEE

[UNDER DEVELOPMENT]